



QST

April 1998

Official Journal of
The American Radio
Relay League

devoted entirely to

AMATEUR RADIO

\$1-

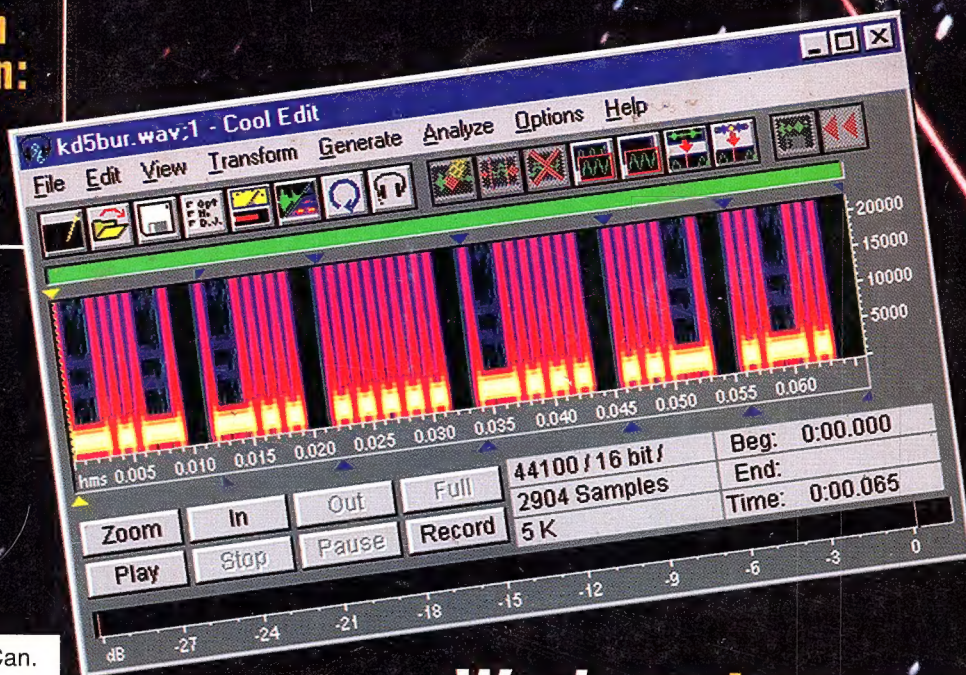
QST compares:
Dual-band H-Ts

**Build a high-performance
receiver with DSP filtering**

Go HF digital with VolksRTTY

**New Ham
Companion:**

Practical
information
for all hams



\$4.95 U.S. \$5.95 Can.

04 >



**Work meteor scatter
with high-speed CW!**

Actual Size!

2-5/16" (w) x 5-1/2" (h)
x 1-5/16" (d)

PC Program Your Icom and

Hit the Road!

Planning a trip? Why not plan your ham communications ahead of time, too? With a PC and ICOM's new 2-meter IC-T2A*, it's easy!

Store sets of working frequencies, like those found in a repeater directory right in your PC. Then download up to 40 of those frequencies right into the IC-T2A. Have your hobby all packed and ready to go in just minutes!

Easy to Program

Using the IC-T2A on the go is a breeze. The front panel keys are large and well spaced. The single tactile knob is for on/off and volume – squelch is handled automatically for your convenience, but can always be manually overridden. Forget how to update a function setting? The backlit display guides you with an "intuitive" help function.



The IC-T2A is designed to survive the rough journey. Its one piece, die cast aluminum chassis and super-tough polycarbonate casing allow you to toss it right into a glove box or into a backpack!

Comments – December '97 QST review...

"The radio provides lots of flexibility"

... "As for ruggedness, the radio got high marks"

"Sturdy and well designed"...

"You'll have fun with this one"

**Lowest Priced
ICOM 2M!**

IC-T2A

Experience Ni-Cd or

- 4.5 Watts of Power
- Transmit 140-150 MHz, Receive 136-174 MHz
- Built-In Tone Squelch with Pocket Beep and Tone Scan
- PC Programmable *(options CS-T2 & OPC-478 req.)
- IC-T2A Radio-to-Radio Clonable (opt. OPC-474 req.)
- 8 Programmable Keys



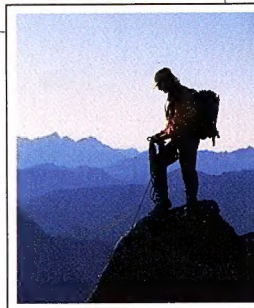
8-"AA" Size Ni-Cd Rechargeable Batteries Included!

Use the included 120V wall plug charger or use a car cigarette lighter (option CP-12/L req.) to charge the "AA" Ni-Cd batteries right in the IC-T2A! **Or power your IC-T2A with low cost, off-the-store-shelf "AA" alkalines!**

Alkaline Versatility!

- Auto Repeater Function
- "Intuitive" Help Function
- 2-Step Power Save Function
- Monitor Function
- 43 Memory Channels
- 5 DTMF Memories with up to 32 digit Codes & Re-Dial for Autopatching Repeaters
- Direct Keypad Frequency Entry
- Backlight LCD Display

Visit your ICOM dealer, or call for a free brochure: 425-450-6088



ICOM

PC Powered!

<http://www.icomamerica.com>

"Our IC-756 hit the ground running – in large part because the steep learning curve encountered with some new transceivers simply didn't exist with the IC-756."

– QST, May 1997



ICOM's IC-756: See and HEAR the Performance

Advanced features, in the spirit of the IC-781.
But at a real down-to-Earth price.

HF+6M!

- 4.9" Concentrated Information LCD Display with dot matrix characters
- 5-100 variable-control watts of 100% stable output power (5-40 W on AM)
- All mode: SSB/AM/FM/CW/RTTY
- Built-in automatic antenna tuner with preset 100 kHz steps – RX and TX
- Quadruple conversion superheterodyne (triple conversion on FM)

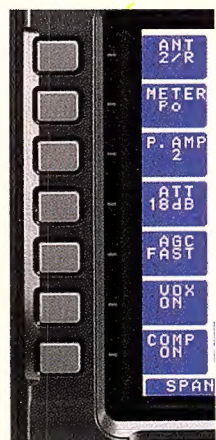
- Noise Reduction (NR)
- Auto DSP controlled notch filter
- Selectable Audio Peak Filter (APF)
- Phase Shift Network (PSN) modulation/demodulation

IF-DSP

"(Our IC-756) even worked on atmospheric noise, and it did not exhibit that annoying hollow sound we've noticed on some other DSP NR systems.

The ability to tweak transmit audio to taste was a real plus. Everyone's voice is different, and this DSP feature bursts through the old 'one size fits all' mentality...."

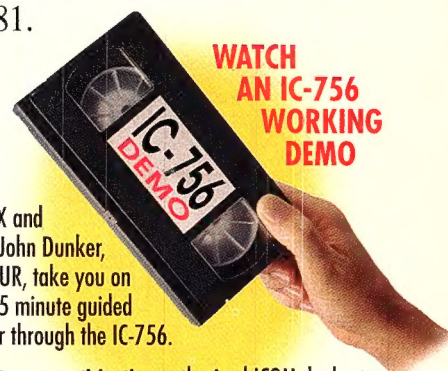
– QST, May 1997



- True dual watch (2 signal simultaneous reception)
- Twin passband tuning
- 2 slots for optional filters
- 101 memory channels
- High performance memory keyer
- Voice synthesizer (opt. UT-102 req.)



BUILT-IN CI-V INTERFACE
Options required for PC programming:
CI-17 CI-V Level Converter,
third party serial cable with pins 1-8 & 20



**WATCH
AN IC-756
WORKING
DEMO**

QRX and let John Dunker, W9UR, take you on a 45 minute guided tour through the IC-756.

Visit your participating authorized ICOM dealer to view the video. John will walk you through the on-screen function key operations, memory settings, and band condition controls, plus offer some helpful tips to HF newcomers.

VALUE

Step up to a higher performance rig without paying a higher price.

Call ICOM's brochure hotline today at 425-450-6088 or see the IC-756 at your ICOM dealer!

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Full Line of

quality

UNIVERSAL CHARGER

MH-C777 *Universal* Rapid Charger Conditioner

- ✓ Will charge **nearly any type of rechargeable NiMH and NiCD battery pack!**
- ✓ Will **discharge** and **condition!**
- ✓ Latest **-dV** and **temperature** Detection
- ✓ Support **4.8-12V**
- ✓ For mobile and base use!
- ✓ **Free car adapter included!**

Charge nearly all of your amateur radio battery packs with it, plus more.....

Cellular, Notebook Computer, Two-Way Radio, and more!

MH-C777 from your local dealer....

\$49.95

The breakthrough adjustable contacts make it truly universal!

The MH-C777 will not only charge your battery but also condition it!

External magnetic temperature probe!

Powerful magnet that will hold your battery pack in place!



900mAh



MH-PB-34
For Kenwood TH-79/22/42
900mAh, 9.6v

1800mAh



MH-FNB-V47
For Yaesu FT-50R/10R/40R
1800mAh, 7.2v

1000mAh



MH-BP-180
For Icom T7A/T22A/W32
1000mAh, 7.2v

NiMH BATTERY PACKS

- ✓ **New technology**
- ✓ **No** memory effect
- ✓ 50-100% **more** capacity than same size NiCad
- ✓ **Light** weight
- ✓ Flat Discharge Curve
- ✓ **Small** Size
- ✓ Environmental **friendly**
- ✓ Many **other** models available
- ✓ **One** Year Limited Warranty for all battery packs

MAHA

*"Your Supplier, Your Partner,
Your Friend!"*

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For More Information!**

Handheld Accessories...

POWER AMPLIFIERS



MH-A103



MH-A301

Maha offers reliable, powerful, and economical power amplifiers. Ranging from 35 watts to 100 watts output power, the different **PowerAmp** models give you versatile functions. On some models, they are equipped with the state-of-art **GaAsFET pre-amplifier**, enhancing your receiving capability. Operate Maha PowerAmp and commence reliable and enjoyable communications!

Available Models

MH-A104 PRO

- ✓ 2m : 100W @ 4W in!
- ✓ Adjustable Output & Gain
- ✓ Adjustable Pre-Amp
- ✓ Output Indicator, and more....
- ✓ FM/SSB/CW All Mode!!

MH-A101: 2m/35W @ 5W

MH-A102: 2m/35W @ 5W Pre-Amp, SSB/FM

MH-A103: 2m/50W @ 5W Pre-Amp, SSB/FM

MH-A201: 2m/70cm 45/35W @ 5W

MH-A301: 2m/50W @ 5W Pre-Amp

MH-A302: 2m/70cm 45/35W @ 5W

NEW!
PRO!

Also Available

Docking Booster...

Change your handheld into a powerful mobile, *instantly!*

Maha's new **docking boosters** are the affordable solutions to your weak signal problems. The MH-A300 series docking booster utilizes a compact amplifier, and with the appropriate adapter, you will boost the 5 watt output power of your handheld to the higher output power of a more expensive mobile radio while maintaining the portability of your handheld. You can instantly switch from a powerful mobile radio to a portable handheld with ease! Put your radio on Maha's new MH-A300 series docking booster and see what it can do for you!

MAHA

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Your Friend!"

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For More Information!

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Technical

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Phil Salas, AD5X

A 1:1 SWR from 160 meters to 70 cm—guaranteed!

34 High-Speed CW and Meteor Scatter— An Exciting VHF DX Medium!

Jim McMasters, KD5BUR

Don't let the title scare you. You don't have to be a CW dynamo, and you don't need a high-powered VHF station.

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Rob Frohne, KL7NA

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Rick Lindquist, N1RL

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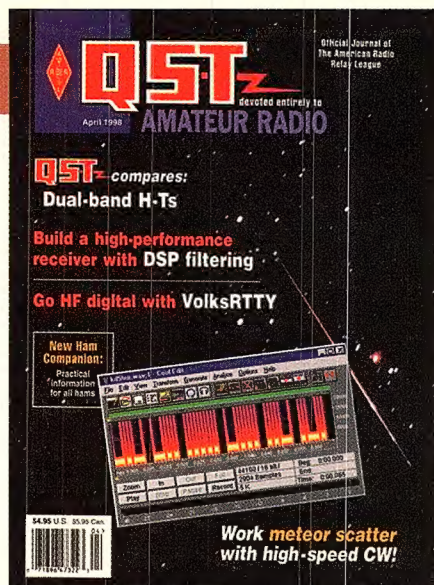
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Our Cover

You don't have to wait for a meteor shower to enjoy meteor-scatter communication. By using high-speed CW—and the appropriate software to help you decode and display the signals—you can make meteor-scatter contacts over great distances *any day*. Hams in Europe have been doing this for years and it's starting to catch on in the US. See "High-Speed CW and Meteor Scatter—An Exciting VHF DX Medium!" by Jim McMasters, KD5BUR, in this month's QST!

Perseid meteor photo taken at Joshua Tree National Park by Wally Pacholka of Long Beach, California; e-mail wallyp1@aol.com; <http://www.newcreations.net/comet>.

CoolEdit screen shot provided by Jim McMasters, KD5BUR.

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THE VECTRONICS HFT-1500 ... THE FINEST HIGH POWER ANTENNA TUNER MADE!

- high current Roller Inductor
- SSB*Analyzer Bargraph™
- Cross-Needle Meter
- 6 position Antenna Switch
- built-in 4:1 Balun
- gear driven Turns Counter

HFT-1500
\$459⁹⁵

The VECTRONICS HFT-1500 is not just an antenna tuner ... it's a beautifully crafted work of art, using the finest components available and the highest quality construction.

Every HFT-1500 aluminum cabinet is carefully crafted with a durable baked-on paint that won't scratch or chip.

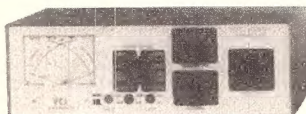
The attractive two-color Lexan front panel is scratch-proof. Take a quarter. Scratch the HFT-1500 front panel as much as you want. *You won't leave a mark!*

Arc-Free Operation

Two heavy duty 4.5 kV transmitting variable capacitors and a massive high current roller inductor gives you arc-free operation up to 2 kW PEP SSB.

300 Watt Antenna Tuner

VC-300DLP
\$159⁹⁵



VECTRONICS uses the finest components available to build the highest quality 300 Watt antenna tuner ever made.

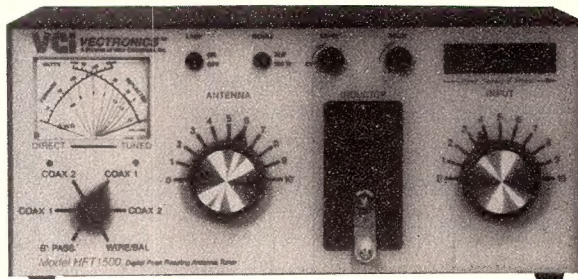
You can tune any antenna 1.8-30 MHz. Custom 48 position switched inductor and continuous rotation 1000 Volt capacitors provide arc-free operation. Handles 300 Watts PEP SSB, (150 Watts on 1.8 MHz).

8 position antenna switch, built-in 50 ohm dummy load, peak reading backlit cross-needle SWR Power meter, 4:1 balun for balanced line antenna. Scratch-proof Lexan front panel. 10.2x9.4x3.5 in. Weighs 3.4 lbs.

1500 Watt dry Dummy Load



DL-650M, \$64.95. Handles 100 watts continuous, 1500 Watts for 10 seconds to 650 MHz. Ceramic resistor. SWR < 1.3. SO-239 connector. DL-650MN, \$69.95 has N connector.



Precision Resetability

A sturdy hand cranked roller inductor lets you quickly fly from band to band. A precision 5-digit gear driven turns counter lets you accurately return to your previous settings.

Large comfortable knobs and smooth vernier drives on the variable capacitors make tuning precise and easy. Bright red pointers on logging scales make accurate resetability a breeze.

Absolute Minimum SWR

You can tune your SWR down to absolute minimum!

Why? Because all three matching network components, the roller inductor and both variable capacitors, are fully adjustable.

Tune any Antenna

You can tune any real antenna from 1.8 to 30 MHz, including all MARS and WARC

300 Watt Mobile Tuner

VC-300M
\$109⁹⁵



The VC-300M Mobile Antenna Tuner is compact, lightweight, easy-to-operate and is our most economical tuner.

It's compatible with any mobile antenna and any mobile HF transceiver and is compact enough to fit in the most compact car.

It can also be used at home with dipoles, vees, verticals, beams or quads fed by coax. Backlit dual movement meter simultaneously monitors Power and SWR. Covers 1.8-30 MHz. Handles 300 Watts SSB PEP, 200 Watts continuous, (150 Watts on 1.8 MHz.). 7.25x8.75x3.6 in. Weighs 3.4 lbs.

Low Pass TVI Filter



LP-30, \$69.95.

Eliminates TVI by attenuating harmonics at the source. Plugs between transmitter and antenna or tuner. Handles 1500 watts.

bands. You can tune verticals, dipoles, inverted vees, yagis, quads, long-wires, whips, G5RVs, etc ...

SSB*Analyzer Bargraph™

VECTRONICS' exclusive 21 segment bargraph display lets you visually follow your instantaneous voice peaks. Has level and delay controls.

Accurate SWR/Power Meter

A shielded directional coupler and backlit Cross-Needle meter displays accurate SWR, forward and reflected power simultaneously. Reads both peak and average power on 300/3000 Watt scales.

6 Position Ceramic Antenna Switch

Select two coax fed antennas (tuned or bypassed), balanced line/wire or bypass.

Built-in Balun

A 4:1 Ruthroff voltage balun feeds dual high voltage Delrin terminal posts for balanced lines. HFT-1500 is 5.5x12.5x12 inches.

Try any product for 30 days

Call toll-free 800-363-2922 and order any product from VECTRONICS. Try it for 30 days. If you're not completely satisfied return it for a full refund, less shipping and handling -- no hassles. All VECTRONICS products come with a one year warranty.

SWR/Power Meters



PM-30
\$79⁹⁵

PM-30UV
\$89⁹⁵



PM-30, \$79.95, for 1.8 to 60 MHz. Displays forward and reflected power and SWR simultaneously on dual movement Cross-Needle Meter. True shielded directional coupler assures accuracy. Backlit meter displays peak or average power in 300/3000 Watt ranges. First-rate construction includes scratch-proof case/front panel. 5.3x5.75x3.5 inches. SO-239 connectors.

For 144/220/440 MHz, 30/300 Watt ranges. PM-30UV, \$89.95, has SO-239 connectors. PM-30UVN, \$89.95, has N connectors. PM-30UVB, \$89.95, has BNC connectors.

High Pass TVI Filter



HPF-2, \$24.95. Installs between VCR/TV and cable TV or antenna lead-in cable. Eliminates or reduces interference caused by nearby HF transmitters.

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162 Memory Channels
Wide Band Rx
(Air Band, Too)
9600 BPS Packet Ready
(6 pin connection point)
CTCSS Encode/Decode
High Scan Speeds
Built-In Duplexer
Auto Repeater
Optional Infrared
Wireless Mic
(opts. HM-90
+ EX-1759)

ICOM options required for PC cloning:
CS-207 Cloning Software,
OPC-646 Cloning cable
A third party 6-pin serial cable is
required for PC packet connection.



← Under 4 1/2 inches wide →
Front panel: 4 11/32 (w) x 1 17/32 (h) x 1 1/16 (d)

IC-207H
Easy Dual Bander

SAVE \$20 When you purchase a new IC-207H. Offer ends 3/31/98.
See your authorized ICOM dealer for details.

SAVE \$20

ICOM MOBILE SPECIALS

FREE Separation Cable

Free OPC-600 with every
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purchased by 3/31/98. See your authorized ICOM dealer for details.

ICOM options required for PC cloning:
CS-2710 Cloning Software,
OPC-646 Cloning cable.
A third party 6-pin serial cable is
required for PC packet connection.



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- 50 W VHF (2M), 35 W UHF (440 MHz)
- Wide Band Rx (Air Band, Too)
- Independent Band Display Readouts, Volume and Squelch Knobs, and Function Switches
- 50 CTCSS Frequencies
- V/V, U/U Simultaneous Receive

- 220 Memory Channels
- High Speed Scanning
- Programmed Scan (with 3 scan edges) and Memory Scan Functions
- Built-In Duplexer
- Pager, Tone Squelch and External DTMF Control Via Sub Band (opt. UT-49)

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Advanced Dual Bander

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The precision **DELTA** series surge protected coax switches

- **ARC-PLUG®** gas tube surge protection cartridge built-in. All circuits protected
- Master antenna ground function
- Low loss constant impedance micro-strip cavity design. Excellent co-channel isolation. No lossy wafer switches are used. Full power operation
- Positive detent roller bearing switch drive
- Used in commercial and military applications

Model **DELTA-2** (2 position, UHF connectors, 500 MHz).....\$49.95

Model **DELTA-2/N** (2 position, N connectors, 1.3 GHz).....\$64.95

Model **DELTA-4** (4 position, UHF connectors, 500 MHz).....\$79.95

Model **DELTA-4/N** (4 position, N connectors, 1.3 GHz).....\$89.95

TRANSI-TRAP® surge protectors with built-in **ARC-PLUG®** fast acting gas tube cartridges

- Fully tested and UL listed for communications circuits applications. Tested and approved by government and military agencies worldwide. This extensive testing procedure provides your assurance of safety for your system
- **ARC-PLUG®** cartridge is field replaceable for efficient servicing in the event of catastrophic surge levels
- Modern design allows DC control voltages to pass thru for tower mounted amplifiers and similar applications
- Brass constant impedance thru line design
- Designed for 50 ohm coaxial circuits.

Model R-T **TRANSI-TRAP®** protector (UHF connectors, 200 watts)\$36.95

Model R-T/N **TRANSI-TRAP®** protector (N connectors, 200 watts)\$43.95

Model HV **TRANSI-TRAP®** protector (UHF connectors, 2 KW).....\$39.95

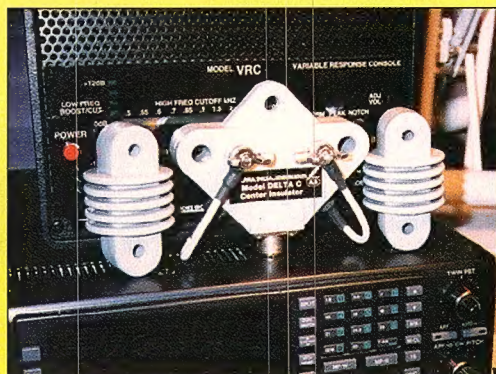
Model HV/N **TRANSI-TRAP®** protector (N connectors, 2 KW).....\$46.95



Other models and connectors styles available.

ALPHA DELTA DX series dipoles and slopers

- Designed for severe weather environments utilizing stainless steel hardware and high tensile strength 12 ga. insulated wire. All models handle full power
- No lossy, narrowband traps are used. Our multi-band antennas are designed with **ISO-RES™** band selection inductors. A tuner may be safely used if needed
- The dipoles use our exclusive model **DELTA-C** static protected center insulator with the **ARC-PLUG®** static protector built-in
- Size for size you won't find a better DX antenna than our single wire and twin wire slopers. The twin sloper provides maximum bandwidth, while the single sloper offers maximum space saving efficiency
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"It Seems to Us..."

The Joy of Morse

For now, the issue of the Morse code testing requirement for an HF license is settled. ARRL members were asked to consider whether or not to support the elimination of the requirement, and by a margin of better than two to one they favored the *status quo*. The ARRL Board of Directors has heeded this mandate.

About 30% of ARRL members disagree. That's a minority, but a substantial one: about 50,000 members. Some believe deeply that the League's position is wrong, and no doubt they will continue to work to change it. They are welcome to do so; representative democracy can be messy and even unpleasant at times, but if history has taught us anything it is that there is no good substitute for constructive discourse—for the mutually respectful clash of competing ideas. Meanwhile, it is important for all of us to remember that the issues on which we agree are far more significant than the ones on which we may disagree. It is fundamental that Amateur Radio as a whole needs to be promoted and defended, and the ARRL is the best means to that end; all else is secondary.

The League's position does not necessarily determine the issue. The Morse requirement is a part of the international radio regulations; these regulations are subject to the will of administrations, not of Amateur Radio organizations. But they have the force and effect of a treaty, and the earliest that administrations will even consider amending or eliminating the treaty document will be toward the end of the year 2001. Two or three more years would pass before any changes in domestic rules could take effect. In short, even those who support change must now accept that the peak of the new sunspot cycle will have come and gone before any change could possibly occur. It's time to move on to other matters.

The licensing requirement debate has obscured how CW is doing as an operating mode. To those who don't listen carefully to the parts of our bands where Morse is used, the answer may be surprising: it's doing very well indeed, even in the part of the spectrum for which it is no longer a licensing requirement. In his February column VHF columnist Emil Pocock, W3EP, discussed "The Necessity of CW" in exploiting unusual propagation modes, even in the world above 50 MHz. This month Jim McMasters, KD5BUR, describes a marriage of CW and computers to take advantage of the most fleeting, yet the most reliable, of VHF propagation phenomena: meteor scatter.

QRP—operating with 5 W or less—is an increasingly popular pursuit for which CW is particularly well suited. Tuning quickly across an HF CW band with your receiver set to an SSB bandwidth, you will miss the fact that there are scads of weak stations whose operators are happily pursuing a low-impact, minimalist approach to radio communication—often with equipment they have built themselves. Not only is it fun, it combines several of the best aspects of Amateur

Radio: improvement of one's operating skills, technical self-training, and the development of an emergency communications capability.

CW contest operators can only chuckle when they hear of the impending demise of the mode. The fact is that scores keep climbing as both the number and the skill of participants continue to increase.

The ARRL staff regularly commissions random-sample member surveys to find out what you like and don't like about QST. The surveys also ask questions about your operating interests and activities. In a late 1997 survey, 46% of all respondents said they used CW regularly or occasionally. This places CW third in popularity among the operating modes, with FM at 78% and SSB at 74%. Among Extras, CW and SSB were tied for second at 78%, just behind FM at 81%. In other words, CW remains a strong second in popularity among HF operating modes, well ahead of everything but SSB.

Finally, if you read our mail you would be forced to conclude that amateurs who operate CW must enjoy Amateur Radio more than others. Complaints about rude behavior, inappropriate language and jamming almost invariably involve voice (and occasionally packet) modes, almost never CW. For many, simply chatting by Morse with old and new friends remains the core of Amateur Radio and a pleasant way to wind down after a hectic day.

But there's another side to this happy picture. While there are enough skilled CW operators among the Baby Boomers to keep the dits and dahs flowing for another three decades or more, recently those of us who enjoy this mode have not done a sterling job of motivating and assisting others in developing those same skills. We have permitted Morse to be seen as an unpleasant obstacle to be overcome, not as an enjoyable skill to be developed for its own sake. Except in a few local training nets, it is rare to hear poorly sent, slow Morse on the air any more. Paradoxically, that's not a good sign. CW operating is learned by practice, and you have to do it badly before you can do it well.

So, here is a challenge to accomplished CW operators and an invitation to other HF licensees. Sometime over the Easter weekend or at some other convenient time during the month of April, *get on the air* in the CW Novice bands. Maybe, invite a friend to join you in your shack. Keep your speed down. Seek out and encourage struggling operators. Don't collect contacts as if they were scalps. Rather, collect them as you would new acquaintances with whom you share a common interest.

If you're a newcomer to CW, no matter what your license class or how long you've been licensed, don't be afraid to make mistakes; that's what the Novice bands are for. We were all struggling beginners at one time, even if selective amnesia protects us from the memory of how truly awful we were!—David Sumner, K1ZZ

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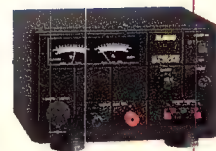
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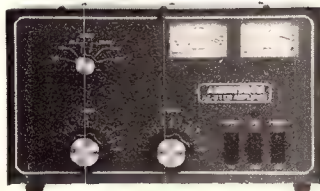
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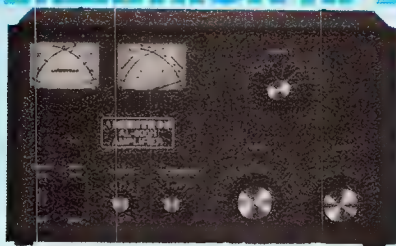
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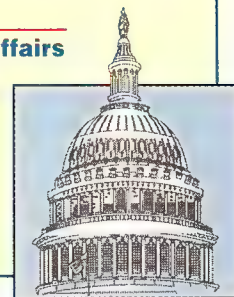
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DC Currents

By Steve Mansfield, N1MZA
Manager, Legislative and Public Affairs



Just as radio waves aren't constrained by artificial boundaries, neither is ARRL's government relations effort. "DC Currents" covers behind-the-scenes activity you need to know about in Congress, at the FCC and other regulatory agencies, as well as at worldwide bodies such as the International Telecommunication Union.

CBO Reviews Auction Options

♦ A seemingly innocent document posted on the Congressional Budget Office's web site (<http://www.cbo.gov/>) actually contains some radical ideas. The likelihood of most of them seeing the light of day is fairly remote, if our Capitol Hill sources are correct, but they are food for thought.

Last month in this column, we analyzed some of the financial implications of spectrum auctions. We noted the staggering sums of money spectrum auctions have poured into federal coffers. The CBO study offers a fascinating glimpse into the history and thinking behind spectrum auctions. It also offers an analysis of where we are now, and an examination of some of the many paths Congress could head down in the future.

The Congressional Budget Office is one of a handful of congressional service organizations that exist to do research on issues of broad general interest to the US Congress. CBO focuses on "scoring" the financial implications of legislation. Another service organization, the Congressional Research Service (CRS), focuses on analyzing the public policy aspects of legislation. Reports from the CBO and

CRS often eventually form the rationale for new bills.

The report, titled "Where Do We Go From Here? The FCC Auctions and the Future of Radio Spectrum Management," was commissioned by the House Budget Committee as part of its deliberations on the balanced budget issue. While the report makes no specific legislative recommendations, it does explore some of the long-range implications of spectrum auctions. It could, at some future time, act as fuel for hearings or further debate.

For amateurs still trying to figure out how radio spectrum became such a pawn in the political budget game, the report's chapter two offers a brief but readable history of the introduction of auctions into the allocation process. For those who are wondering what the future holds, chapter five includes an examination of many possible scenarios for further "reform" of spectrum management, including an expansion of so-called "property rights." This chapter even examines (albeit in a superficial way) the possibility of some deregulation of amateur spectrum allocation.

The fundamental premise of the report is

that effective spectrum management ought to have as its goal "maximizing the social value" of spectrum, by which they mean providing the most benefit to the most people at the best cost. While the general thrust of the report is toward more market-based spectrum management policies, it does note the peculiar position of certain services that probably couldn't compete in a fully deregulated environment.

"As in the allocation of many other resources, unfettered market forces may, in certain circumstances, fall short of efficiently distributing resources among competing uses. The use of the spectrum to provide public goods, such as national security, and the failure of the market to capture the full social value of some radio services, such as amateur radio, are two factors that limit the efficiency of allocation determined by the market."

Even so, the report does not flinch at recommending to Congress that it begin to think "outside the box" on spectrum allocation issues. This includes the radical notion that the block allocation process itself may eventually become an outmoded vestige of 1930s social planning.

State, Local Legislation a Reaction to Antenna Concerns

• Recent federal legislation introduced to strengthen the hand of states and municipalities in telecommunications siting issues is just one piece of a much broader mosaic of state and local initiatives. The intent is to contain the unrestricted proliferation of cellular and PCS antenna structures. Indeed, many municipalities have begun to impose moratoria on the further development of commercial antenna structures, citing either aesthetic or RF health concerns. Those moratoria have, in turn, triggered legal action on the part of cellular and PCS interests, most notably from the Cellular Telecommunications Industry Association. This conflict between commercial telecommunication and citizens is a growing worldwide phenomenon as the cellular and PCS build out continues.

The federal legislation, S. 1350 in the Senate and HR. 3016 in the House, is generally thought by Capitol Hill insiders

not to have much chance this session. Even so, the cellular and PCS industries see the bills as possible harbingers of more troublesome initiatives waiting for

introduction next session. The motivation behind the federal legislation, which would provide a kind of umbrella authority for the proliferation of state and local ordinances

FCC Report Fuels Rumors

• The Federal Communications Commission recently released a list of 31 proposed proceedings for 1998. The wording of at least one of those proposals has fueled rumors of some sort of radical restructuring of the administration of Amateur Radio and the licensing process. But the rumors may be a bit overblown. In its Report No. GN 98-1 posted on the FCC web site in February, the FCC noted its intent to pursue "broad, comprehensive internal review of all existing FCC regulations and informal input from the industry and the public". The report says that could include streamlining the Amateur Radio Service "to privatize further the administration of the Amateur Radio Services and to simplify the licensing process." Our contacts within FCC tell us that the proposal simply refers to internal administrative housecleaning matters, rather than any sort of radical license restructuring. The staff in the Wireless Bureau is still drafting a Notice of Proposed Rulemaking. However, you can be sure we'll be watching this one.

springing up almost as fast as the cellular towers they hope to manage, is being taken seriously by the Federal Communications Commission. As we went to press the new FCC Chairman William Kennard was preparing to visit the state of Vermont to take part in a forum on tower siting. Vermont Governor Howard Dean invited Kennard. The Chairman was earlier reported to have urged more "dialog" between local authorities and telecommunications companies wishing to install new towers and antennas.

Federal authority to regulate antenna and tower placements comes from sections 302 and 303 of the Communications Act of 1934. However, the law that has fueled much of the activity on the part of municipalities over PCS and cellular towers is the Telecommunications Act of 1996. It amended section 332 of the 1934 Act. While reasserting the long-standing principle of federal preemption over telecommunications facilities, the law nonetheless does preserve a good deal of state and local authority over siting. At issue has been certain orders and proposed rulemakings seeking to clarify the situation. The most controversial of the FCC rulemaking proposals addresses the issue of preemption of new digital TV broadcast towers while seeming to sidestep the thornier issue of wireless services like cellular and PCS.

While all of this activity specifically affects commercial installations only, some amateurs have begun to fear that any diminution of federal authority could eventually spill over into the amateur arena. This is where the FCC's "PRB1" ruling has provided some protection from overzealous community regulation since 1985 in the form of limited federal preemption.

Here's a summary of the status of state antenna and tower legislation when we went to press:

Hawaii: HB.3127 was introduced in February to prohibit telecommunication towers within state agricultural districts. The bill is pending in the Committee on Water and Land Use.

Indiana: HB.1051 was introduced in January to allow municipalities and counties to regulate the location, construction, change or removal of telecommunications towers through the local zoning authority. The bill was referred to the Committee on Commerce and Economic Development. SB.160 is a similar bill in the Senate.

Kentucky: HB.73, introduced in January, would require proposals for cellular and PCS antenna towers in counties with certain cities to be submitted to a local planning commission. The bill was referred to the Committee on Cities. HB.168 would allow local governmental units to require proposals for cellular towers to be submitted to them. The bill was referred to the Commit-

tee on Counties and Special Districts.

New Jersey: AB.591 was introduced in January to require the state toll road authorities to hold public hearings and notice to certain property owners before approval of communication tower placements on state lands. The bill was referred to the Committee on Transportation.

Virginia: HJR.258, introduced in January, calls for opposition to any FCC regulation that obstructs the ability of local government to regulate digital TV towers. Another bill, SB.473, also introduced in January, would give communities greater latitude to regulate communications towers on state land and wetlands.

Amateurs Take Things into Their Own Hands

◆ In some areas, amateurs have begun to fight legislation that would restrict antenna installations. They're working to introduce legislation themselves that would ensure that amateur antenna installations are not inadvertently (or intentionally) swept into the same basket as commercial installations. In Virginia, amateurs worked with Senator John Edwards to introduce a bill requiring any ordinance involving the placement of antennas to "reasonably accommodate" amateur radio antennas. The language reflects the FCC's "PRB-1" ruling, long a mainstay in amateur tower siting disputes. The bill, which has passed the Senate and was in the House as we went to press, states:

"Any ordinance involving the placement, screening or height of antennas shall reasonably accommodate amateur radio antennas and shall impose the minimum regulation necessary to accomplish the locality's legitimate purpose. No local ordinance shall (i) restrict amateur radio antenna height to less than 200 feet above ground level as permitted by the Federal Communications Commission, (ii) restrict the number of support structures or (iii) require restrictive variances from reasonable and customary engineering practices for antenna erection, unless an amateur radio antenna clearly represents an unreasonable risk to human health or life."

Should this bill pass, we'll report further on the substantial effort of amateurs to have it favorably considered. We'll also report further on another bill in the Virginia legislature, HB.453, which creates a special program for Amateur Radio license plates. The bill was introduced by Representative Karen Darnier, with the help of ARRL Vice Director Dennis Bodson, W4PWF.

And finally, the work of amateurs paid off at the local level in Bethel, Connecticut, when a new town ordinance was passed addressing commercial tower installations, and containing a full exclusion for Amateur Radio tower installations. According to Connecticut Section manager Betsey Doane, K1EIC, the exclusion was the result of months of hard work by Seabury Lyon, AA1MY, John McDonald, WU1L, Ken Weith, KD1DD, and Jim Ritterbusch, KD1YV. The Candlewood Amateur Radio Association (CARA) and the Bethel Educational Amateur Radio Society (BEARS) worked together on the effort.

Congressional Telecom Agenda Likely to be Short

◆ When Congress re-convened on January 27 after the long year-end break, members faced a large workload with a very limited number of days in session. As a result, the House and Senate Commerce Committees, which are the committees of jurisdiction over telecommunication matters, were forced to cut their losses and focus on those bills that stand the best chance of passage. Our sources in the House and Senate predict that a very small number of telecom bills will actually move out of the committees. In the Senate, one bill that stands a good chance of action is the so-called "slamming" bill, S.1618, introduced by Senators McCain (R-AZ) and Hollings (D-SC). That bill prohibits phone companies from unilaterally changing a consumer's long distance service. There are a number of slamming bills waiting in the wings. Also predicted to see action is the McCain/Hollings "Internet porn" bill, S.1619, which requires schools and libraries to install filters or blocks on their computers to prevent accessing pornography. Failure to do so would make them ineligible for federal "universal service assistance," a fund created under the 1996 Telecommunications Act to help schools pay for advanced telecommunications capability. The Senate may well take a look at S. 1422, the Federal Communications Commission Carrier Oversight Act, which clarifies the laws on copyright and licensing of programming carried by commercial satellites. Finally, the Senate has planned FCC oversight hearings for May and June to look at the Commission's performance and examine restructuring options.

The House is likely to look at a Satellite bill, HR.1872, introduced by Commerce Committee Chairman Thomas Bliley (R-VA-7th). The Bliley bill is intended to promote privatization and competition in the satellite service. The House is also likely to make an effort to pass HR.3269, the controversial Wireless Privacy legislation introduced by Telecommunications Subcommittee Chairman W.J. "Billy" Tauzin (R-LA-3rd). That bill was modified substantially after outcries from hams, volunteer firefighters, crime prevention groups and scanner buffs.

Whether or not House or Senate leadership will allow any telecommunication legislation to come to a vote on the floor is an open question right now.

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Use dual receive (V+V, U+U or V+U), or talk on one band while listening on another. Watch Yaesu's exclusive Enhanced Smart Search™ automatically seek out and load active frequencies--great for finding new repeaters while traveling.

Get wide receive coverage--from 110 to 550 MHz and 750 to 1300 MHz* for public safety, marine, aircraft, and weather channels. Enjoy up to 50 Watts of VHF power output (35 Watts on UHF) with High/Medium/Low choice on each band, and "plug and play" 1200 or 9600 bps packet. Utilize 208 memory channels--the greatest available on any remote mobile--to store repeater offset, CTCSS tone, packet baud rate, and power level.

Yaesu's popular Omni-Glow™ display provides a wide field of view, and includes a DC voltage meter. Quickly program, or clone frequency memories with optional Windows™ PC programmable ADMS-2D.

"User-friendly" describes the streamlined front panel layout. Eight clearly-marked keys, and separate Volume/Squelch controls for each band, make operation easy. And the backlit DTMF microphone includes 3 user-programmable keys...but no awkward keypad cover!

Don't sacrifice high-performance features in your dual-band mobile installation. Get the easy-to-use FT-8100R at your Yaesu dealer now!

YAESU
...leading the way.™

For the latest Yaesu news, hottest products: visit us on the internet! <http://www.yaesu.com>

Features

- Frequency Coverage
 - RX: 110~550 MHz
 - 750~1300 MHz*
 - TX: 144~148 MHz
 - 430~450 MHz
- Detachable Front Panel (removable w/optional YSK-8100)
- 3 Power Output Levels
 - 2m 50/20/5 Watt
 - 70cm 35/20/5 Watt
- 208 Memory Channels
- Enhanced Smart Search™
- CTCSS Encode
- Built-in Duplexer
- S-Meter Squelch
- Dual Receive (V+V, U+U, V+U)
- Crossband Repeat (bidirectional or one-way)
- PC Programmable w/optional ADMS-2D
- Digital Battery Voltage Display
- Auto Power Off (APO)
- Omni-Glow™ Display
- 1200/9600 bps Packet Compatible
- Alternating-Band Memory Selection (ABMS)
- DTMF Autodialer (6 Memories)
- Time Out Timer (TOT)
- Accessories: Consult your local Yaesu dealer.

*Cellular & 900 MHz Cordless Phone frequencies blocked.



EARTH STATION FT-847

HF/50/144/430 MHz All Mode Transceiver

"Compact, too—great for our next 'lover' operation."

"HF, VHF/UHF, and satellite, all-in-one!"



"Looks like Yaesu did it again!"

"And the DSP helped me hear my first moonbounce signal, ever!"



The FT-847 changes base station operation forever. Now, three radios in one--HF, VHF/UHF, satellite; technology in its finest application, from the world leader in amateur communication.

With its unequaled combination of features, like DSP filters—notch, NR and BPF, built-in 6-meter, voice monitor, separate sub-band dial, Shuttle Jog dial, Smart Search, and digital meter, the FT-847 is the only radio of its kind! Exclusively for satellite work, 19 memories exceed any other radio. For performance, power-up with 100W for HF/6-meter, and 50W for 2-meter and 430 MHz. Additional "must-haves" include cross-band full duplex, normal/reverse tracking, CTCSS and DCS encode/decode, and direct keypad frequency entry. Plus, the FT-847 is 1200/9600 bps packet-ready.

Take the next step in all-band performance and take home the FT-847 today!

**Only one transceiver gives you
all mode operations on HF/50/144/430 MHz
with full Satellite capability.**



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Yaesu Patented
Design

ATAS-100

Active Tuning Antenna System

Designed for the FT-847. Works on 7/14/21/28/50/144/430 MHz Amateur Bands for mobile operation.

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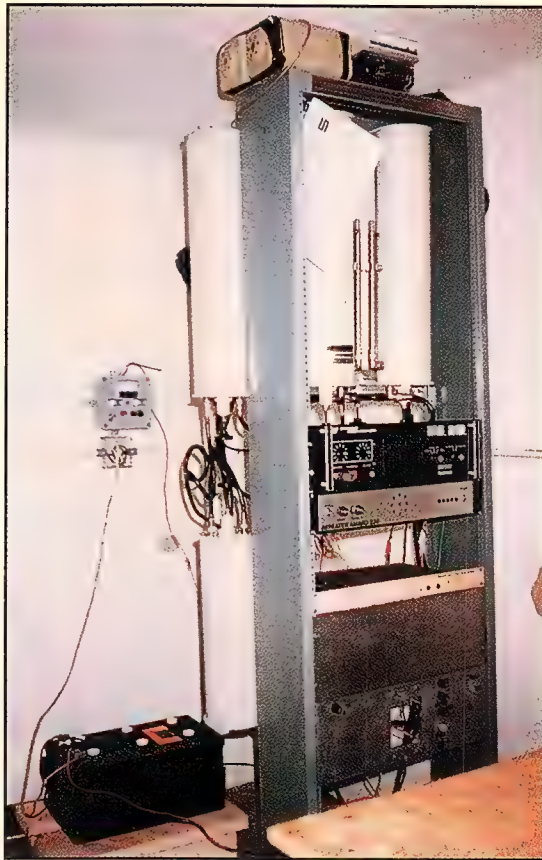
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Specifications subject to change without notice. Specifications guaranteed only within amateur bands.

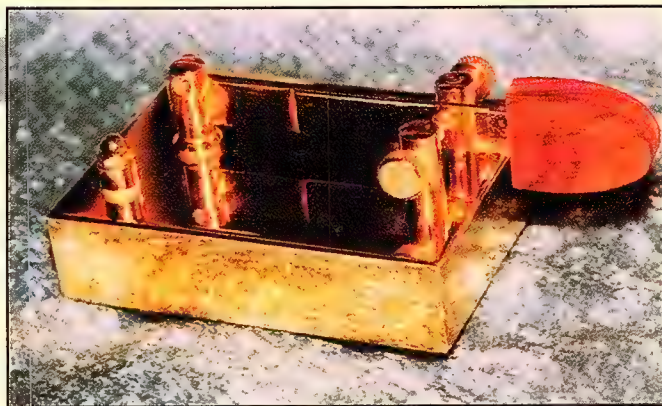
Some accessories and/or options are standard in certain areas. Check with your local Yaesu dealer for specific details.

Up Front in

QST



A repeater system that runs on hot air! Well, warm tropical breezes anyway. The Cadena El Conquistador group (NP3P) operates an impressive packet and voice repeater system in Rio Grande, Puerto Rico using a tower-mounted wind generator (far left) as their primary power source. The breezes stir almost continuously, creating more than enough energy to keep the deep-cycle battery in the equipment shack fully charged (left).



Here's a "cootie" any ham would love to have!
 Mike Hyder, N4NT, hand-crafted this elegant
 sideswiper (or "cootie") key from a design by K4KP.
 Most of the shine is provided by the polished brass.
 The fingerpiece is made from cocobolo wood.

See you at the Science Center

If your travels take you
to Arizona, stop in
Phoenix and visit the
Arizona Science Center.
This popular new attrac-
tion is pulling in people
from all over the US.





Wood you put up a tower like this one? Excuse the pun, but it applies perfectly to these photographs. Douglas Bainbridge, NØHPK, assembled a 72-foot tower made entirely of Douglas fir and held together with nails and epoxy adhesive. From a distance it looks like any steel tower (right). Only when you're up close (above) do you realize that it is made of wood. Despite the load from his 2-element, 15 and 17 meter quad antenna, the tower has withstood wind gusts above 70 MPH.



STEVE AUVER, N2TKX



Aeronautical SSTV. Visitors to the Amateur Radio exhibit at the Syracuse, New York, Museum of Science and Technology were treated to an unusual slow-scan TV (SSTV) demonstration. The local Civil Air Patrol (CAP) demonstrated the equipment they use to support their damage-assessment duties. Operating from a CAP aircraft, the gear transmits still photos to amateur ground stations using SSTV. For this image the aircraft flew over the domed stadium at Syracuse University. Watching the results (left to right) are Jim Edmonds, WA1KPG, of the Civil Air Patrol; Rachel Nettleton, Director of Education for the museum; and Pete Newell, KC2WI of the Civil Air Patrol.



But what does W900L think? And what would the winner do with the hapless ham? Not to worry. According to the FCC database, the call sign W900L is currently unassigned. That's probably a good thing. The winner of MHC's contest would no doubt have the poor guy stringing up new house wiring, doing dishes, taking out cat litter and other ungodly acts. Gary Meyers, KYØB, snapped this thought-provoking shot southwest of Springfield, Missouri.

MIRAGE... 100 Watts... \$199

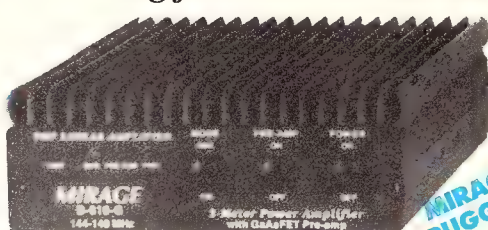
Boost your 2 Meter handheld or multimode (like ICOM 706) to a super powerful 100 watts... All modes: FM, SSB, CW... 15 dB GaAsFET receive preamp... Reverse polarity protection... Silent cooling fan... Free HT-to-amp coax and mobile bracket

In Stock at ham dealers everywhere!

Call your dealer for your best price

\$199

B-310-G Suggested Retail



MIRAGE RUGGED!

Polarity Protection can save your amp if you connect power backwards.

Compact but Powerful

Mirage's integrated HeatsinkCabinet and whisper quiet fan gets heat out fast!

The results? An ultra-compact 4 3/4 x 1 3/4 x 7 3/4 inch 2 1/2 pound amplifier that delivers a super powerful 100 watts.

Free Accessories

Free 3 foot handheld to B-310-G coax cable -- just plug and play! Free mobile bracket. Free rubber mounting feet for home use!

Plus more...

Automatic RF sense Transmit/Receive switch. Remote keying jack. LEDs monitor "On Air", high SWR, pre-amp, power. Push buttons select SSB/FM, pre-amp, power. Draws 15 amps at 12-15 VDC.

Full one year MIRAGE warranty

With Mirage's legendary ruggedness, you may never need our superb warranty.

Power Curve -- typical B-310-G output power

Watts Out	25	50	75	95	100	100+	100+
Watts In	1/4	1/2	1	2	4	6	8

For an incredibly low \$199, you can boost your 2 Meter handheld to a super powerful 100 watt mobile or base!

Turn "You're breaking up... Can't copy" into "Solid Copy... Go ahead."

Talk further... Reach distant repeaters... Log onto faraway packet bulletin boards.

This rugged Mirage B-310-G amplifier

operates all modes: FM, SSB and CW. It's perfect for all handhelds up to 8 watts and multi-mode SSB/CW/FM 2 Meter rigs.

It's great for the ICOM IC-706 -- you'll get 100 blockbuster watts on 2 Meters!

Low noise GaAsFET pre-amp

A built-in low noise GaAsFET receive pre-amp gives you 15 dB gain -- lets you dig out weak signals.

Fully Protected

SWR Protection prevents damage from antennas whipping in the wind. Reverse

Dual Band 144/440 MHz Amp

at the same time -- just like a telephone conversation! (Requires compatible HT)

Mirage is the Best! Here's why...

• Automatic frequency band selection -- you'll never forget to switch bands

• Single input connector and single output connector for both bands -- easy to use with dual band radios and antennas

• First-class strip-line techniques -- superb RF performance and reliability

• Custom wrap-around heatsink -- runs cool

• Reverse Polarity Protection -- saves your amp if you connect power backward

• Automatic RF sense Transmit/Receive switch -- makes operation easy

• Low input SWR -- keeps your handheld safe from overheating

• "On Air" LEDs -- for each band

• Free mobile mounting bracket

• Free 3 foot handheld-to-BD-35 coax cable

• Small size: just 5x1 3/4x5 inches

• Full one year MIRAGE warranty

• Legendary MIRAGE ruggedness

Call your dealer today for your best price!



\$159.95

BD-35 Suggested Retail

Power Curve -- typical BD-35 output power

Watts Out (2Meters)	30	40	45	45+	45+	45+	45+
Watts Out (440 MHz)	16	26	32	35+	35+	35+	35+
Watts In	1	2	3	4	5	6	7

Add this Mirage dual band amp and boost your handheld to 45 watts on 2 Meters or 35 watts on 440 MHz!

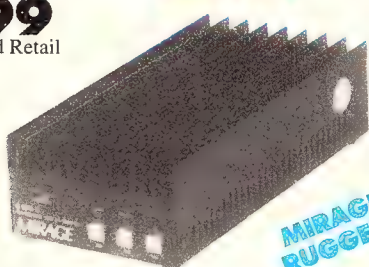
Works with all FM handhelds up to 7 watts. Power Curve chart shows typical output power.

Full Duplex Operation

Mirage's exclusive FullDuplexAmp™ lets you talk on one band and listen on the other band

160 Watts on 2 Meters!

B-5016-G
\$299
Suggested Retail



MIRAGE RUGGED!

The MIRAGE B-5016-G gives you 160 watts of brute power for 50 watts input on all modes -- FM, SSB or CW!

Ideal for 20 to 60 watt 2 Meter mobile or base. Power Curve chart shows typical output power.

Hear weak signals -- low noise GaAsFET preamp gives you excellent 0.6 dB noise figure. Select 15 or 20 dB gain.

B-5016-G has legendary ruggedness. We know of one that has been in constant use since 1979!

Heavy-duty heatsink spans entire length of cabinet -- prevents overheating. Power transistors protected by MIRAGE's Therm-O-Guard™.

Fully protected from high SWR and excessive input power. Has warning LED.

Has smooth adjustable Transmit/Receive switching with remote external keying.

RC-1, \$45, Remote Control. On/Off, pre-amp On/Off, selects SSB/FM. With 18-ft cable.

Draws 17-22 amps at 13.8 VDC. 12x3x5 1/2 in.

Power Curve -- typical B-5016-G output power

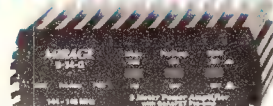
Watts Out	130	135	140	145	150	155	160	165
Watts In	20	25	30	35	40	45	50	55

35 Watts for 2 Meter HTs

B-34-G

\$89.95

Suggested Retail



MIRAGE RUGGED!

Power Curve -- typical B-34-G output power

Watts Out	18	30	33	35+	35+	35+	35+	35+
Watts In	1	2	3	4	5	6	7	8

• 35 Watts Output on 2 Meters

• All modes: FM, SSB, CW

• 18 dB GaAsFET preamp

• Reverse polarity protection

• Includes mobile bracket

• Auto RF sense T/R switch

• Custom heatsink, runs cool

• Works with handhelds up to 8 watts

• One year MIRAGE warranty

35 watts, FM only... \$69.95

B-34, \$69.95. 35 watts out for 2 watts in. Like B-34-G, FM only, less preamp, mobile bracket. 3 1/8 x 1 3/4 x 4 1/4 inches.



More 160 Watt, 2 Meter Amplifiers...

B-2516-G, \$299. For 10 to 35 watt mobile or base stations. 160 watts out for 25 watts in.

B-1016-G, \$379. MIRAGE's most popular dual purpose HT or mobile/base amplifier. 160 watts out/10 W in. For 0.2-15 watt transceivers.

B-215-G, \$379. MIRAGE's most popular handheld amp. 150 watts out/2 watts in; 160 watts out/3 1/2 W in. For 0.25 to 5 watt handhelds.

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MIRAGE... the world's most rugged VHF/UHF amplifiers

You Have Reached Cruising Altitude

There is little to beat the sheer pleasure of owning and driving a performance car. But an alternative way to enjoy first-class convenience on the road is Kenwood's new TM-G707A, an FM dual-bander (144MHz/440MHz) expressly tailored for your cruising comfort.



TM-G707A FM DUAL BANDER

Power up and you're greeted by the welcoming glow of an amber-colored LCD. You can always be sure of a friendly reception from Kenwood's TM-G707A, an FM dual-band transceiver that is a joy to use.

For some drivers, visibility is everything. That's why the TM-G707A has an extra-large display. Capable of showing up to 7 large characters, the **high-visibility amber LCD** features a 4-step dimmer control to suit all driving conditions, day or night. A convenient touch is the automatic brightness control during operation.

The TM-G707A is simple and straightforward like a car stereo, thanks to **Easy Operation** mode. You just choose a frequency and press one of the 3 quick memory keys to save it. A light touch on the same key is all that is needed for recall. And with the **Five-in-one programmable memory system**, you can store five operating profiles - complete with frequency range, dimmer level, and other details - ready for instant recall at the push of a button.

Another convenience that is especially welcome on the road is the **Memory Name** function. This allows you to identify each memory position with up to 7 alphanumeric characters. You can also switch instantly between the frequency and Memory Name displays.

Optimized convenience goes hand in hand with polished performance and a wide range of advanced features, such as a built-in **CTCSS encoder/decoder**,

built-in duplexer and priority scan. The front panel features a 6-pin **mini DIN connector** for either standard 1200bps or 9600bps high-speed packet or APRS communications. Also, **180 multi-function memory channels** are available for storing such data as transmit and receive frequencies independently (thus allowing split-frequency operations), frequency step, and tone frequency. Among the many options available is a **quick-release detachable front panel kit** for anti-theft protection.

There's an open road ahead for the future of mobile communications, and Kenwood's TM-G707A is showing the way.

- ▶ Power output 50W VHF, 35W UHF
- ▶ Wide range coverage (including aircraft receive)
- ▶ Superior intermodulation rejection characteristics
- ▶ Heavy-duty heat sink construction
- ▶ PC programmable
- ▶ Supplied MC-53DM multi-function backlit microphone with DTMF
- ▶ Full band scan, program band scan, memory scan with memory channel lock-out, MHz scan and call scan with TO (time-operated) or CO (carrier-operated) resume modes
- ▶ CTCSS tone scan
- ▶ Voice Guide (requires VS-3 option)

- ▶ Selectable frequency step (5, 6.25, 10 12.5, 15, 20, 25 or 50kHz)
- ▶ Incremental MHz Key
- ▶ AIP (Advanced Intercept Point)
- ▶ Memory shift (odd splits)
- ▶ S-meter squelch
- ▶ Auto repeater offset (144MHz)
- ▶ Power-on message
- ▶ 3-position RF output power control
- ▶ Time-out timer (TOT)
- ▶ Auto power-off circuit



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UK PLATES

◆ The January *QST* finally staggered this far by seemail yesterday. When I opened the issue to page 21 ("Up Front"), I couldn't help but chuckle at WBØBMY's photo of what at least looked like an American call sign—K8SLX—on a British automobile registration plate.

There has been some fruitless wrangling going on here in the UK for years between the Radio Society of Great Britain and the DVLA (the government body that issues registration plates) for us to be able to buy "personalized" plates with a G prefix. If it ever comes, it will be rather late—in an ironic sense.

The first letter on registration plates denotes the year the car was registered when it was new (although the plates can be transferred once issued to newer vehicles). The "K" plate that WBØBMY captured with his camera is a 1994 issue. "N" plates were issued in 1991. We'll finally have "W" appearing on our plates in a few years! Perhaps by then we will have *British* call signs on them as well.—*Fred Handscombe, G4BWP, Cambridge, United Kingdom*

A COMPUTER CAVEAT

◆ Kirk Kleinschmidt, NTØZ, wrote an excellent article about building personal computers instead of buying. I've been in "the business" since 1963, and I would add one caveat: This is not for the weak of heart. Many firms that sell "pieces and parts" let you know in no uncertain terms that, once you've left their business, you're on your own. Make sure you have an Elmer to help you out of tight spots, or you could end up with an expensive pile of disconnected "stuff." Make sure that you can return defective parts for exchange (very few companies will refund money). As I said, it was a well-written article and it covered quite a bit of territory in a few pages. Keep up the good work!—*Gene Vajgrt, KD4DIY, Mobile, Alabama*

TOP 10 THINGS A HAM NEEDS IN HIS/HER SHACK

◆ 10. 589 copies of *QST*, each carefully catalogued by dates, product reviews, and articles in your Pentium II computer.

9. A Pentium II computer.

8. Numerous unwashed coffee mugs with your Novice, Technician, General, Advanced, Extra and first, second and hopefully *last* vanity call sign on them.

7. A very big box of assorted resistors, capacitors, ICs, LCDs, transistors, insulators, and 256 unread copies of *QST*—still

uncatalogued in that Pentium II computer!

6. Various copies of *US Call Books* with your Novice, Technician, General, Advanced, Extra, and first, second and hopefully *last* vanity call sign.

5. Several extremely green slices of what vaguely resembles pizza from last year's three-day DX contest. They're beside the unwashed coffee mugs. See number 8 above.

4. 2876 QSL cards you still haven't mailed.

3. 5865 DX QSL cards you still haven't catalogued in that Pentium II computer.

2. A picture of you with your arm lovingly wrapped around your loved one, ie, that brand new transceiver!

And the number 1 thing a ham needs in his/her shack ...

1. A lot of free time!—*Robert Mauro, KZ2G, Levittown, New York*

SHOULD WE EVER SAY NO? MAYBE?

◆ These comments are in response to an article by Jerry Boyd, K6BZ, which appeared in the "Public Service" column in the January 1998 *QST* ("Public Service—Should We Ever Say No?").

Should we ever say no? Yes, but only for *some* of the reasons specified by Jerry Boyd, K6BZ. I began public service, via Amateur Radio, back in 1964. Presently I am an active member of the local ARES and RACES groups. I am also a Red Cross volunteer.

Mr. Boyd indicates that we should say no to any requests to provide service that are in conflict with the rules governing Amateur Radio. This statement is a "no-brainer" and I surely agree that Amateur Radio should never be used in violation of Part 97, or in violation of any other government rule or regulation.

I also agree with Mr. Boyd that we should not put ourselves in any situation that could be hazardous to ourselves or our property in the name of Amateur Radio. Any professional disaster training will teach that unless you're trained and equipped to deal with hazardous environments, stay out.

But I disagree with the section entitled "Using" Volunteers. Mr. Boyd talks about served agencies requesting our services for "all the wrong reasons." Well, other than illegal operations or hazardous duty, I can't think of any other "wrong reasons." If we are asked to develop a relationship with an agency, even for political purposes, we must go for it. It is these relationships that we can draw upon during our time of need. A letter

of recommendation from the Sheriff's office or City Manager goes a long way when applying for grants for new equipment. Another reason for getting involved with as many agencies as possible, even though they've never planned to use Amateur Radio, is to get to know their operations and personnel. During a large disaster this information can be very useful. It never hurts to have friends in high places! I don't see these agencies as "using" Amateur Radio, but they are allowing us to become involved in the system. We should be thankful for the opportunity and take full advantage of it.

The last of Mr. Boyd's reasons for saying "no" is to avoid involvement in so-called "non-ham" functions. This portion of the article did not surprise me. Over the many years of performing Amateur Radio public service, I have seen this attitude among hams. Many hams see public service work as a chance to play with their radios—period. They don't want to be called upon to do anything else during the event. But during a disaster we are providing emergency communication where lives and property are in serious jeopardy. We are there to provide our service to help the people of our community the best we can. This sometimes means driving a truck, acting as a shipping clerk etc. This non-ham involvement builds confidence. We, as Amateur Radio operators, are confident that we can perform the task at hand and the served agency's management is also assured that we fully understand the jobs required to provide the community relief. You can be sure that the only reason a skilled radio operator is used to help load supplies is because there is a desperate need for those supplies to be loaded.

Yes, there are times to say no, but I hope they will be far and few between.—*Randy Krofick, AA3CI, Greensburg, Pennsylvania*

SALUTE!

◆ I would like to salute the many hams who went the distance and gave their utmost support during last year's horrific flooding in Grand Forks, North Dakota. (See "The Grand Forks Flood," February 1998 *QST*, page 28.) But above all, I salute the Air Force commanders in the Grand Forks area who released their men and women to help. This is what we in the armed forces should strive to do—give in time of need. This is an ideal I hold dear to my heart because I am also serving in the US Army. In addition to my military duties, I enjoy my work as the disaster team leader for the Clarksville Amateur Transmitting Society RACES/

ARES team in Montgomery County, Tennessee. I encourage other service members and their commanders to get involved. Remember: We are part of Your local communities, too.—*Albert Furlow, KA1FFO, Clarksville, Tennessee*

IS E-MAIL TOO EASY?

◆ Are some hams unconsciously allowing the convenience of e-mail to undermine systematic Amateur Radio traffic handling? E-mail is very useful for rapidly sending messages to individuals or groups. This letter was sent to *QST* by e-mail because it's handier to do it that way.

E-mail is so easy to use; it's tempting some amateurs to use it for moving third-party messages that started out on Amateur Radio. I've often heard amateurs use e-mail to relay messages that would normally move by radio. They may think this is the "most expeditious route" for the traffic, but that can be a fancy way of saving "lazy." The excuse may be that band conditions were poor, or there was no station available to take the message. Sorry, folks, but all too often it sounds to me like they just didn't want to make the extra effort to do the job by radio.

What did dedicated traffic handlers in the past do when there was no convenient e-mail? They hunted for another route, another band, another net, whatever it took to pass the traffic. They did not hold it three days, then service it back as undeliverable! I cringe when I hear that happen.

To a serious traffic handler, the only excuse for saying a message is undeliverable is that the addressee cannot be found by all reasonable efforts. In the "good old days," those efforts could include a postage stamp or a low-cost phone call, not enough to break up anyone who can afford one of those modern ham rigs.

E-mail is attractive, and these attractions are being used to justify short-circuiting the system that amateurs have developed over many years as a way to move messages for drill and for public service. This system is getting a little creaky, and it needs help. It certainly does not need a lazy short circuit that further hampers its effectiveness.

It's getting harder to move messages by radio because not enough hams are interested, but that is not a valid excuse for abandoning radio in preference to e-mail. Moving public service messages by radio is one of the capabilities that help us justify having our frequencies. We're supposed to have the skills and abilities to use our radios for public service. It takes little skill or ability...and no radio license...to move messages by e-mail.

A reasonable compromise could be to hone our skills and use our nets for drill and for public service. We could do this by sending traffic by radio, just as hams have been doing for a long time, and use the convenience of e-mail for sending net news letters and the like, and for messages truly impossible to relay any other way. There really are very few such messages for an

amateur who's willing to work a little instead of play with his e-mail machine. A true public service traffic net has little time for being an e-mail "chat group."

Does your net do this? Do you think replacing ability and dedication with e-mail convenience is beneficial to amateur radio...or even justifiable? Do you want a 10-year-old with a computer to show the public, the FCC and the world that he can do just as well handling messages as you can with your fancy radio? How then will you justify having that radio license and access to those favorite frequencies? When a big storm takes down the phone lines, that e-mail computer won't be much use, but radio will be available—for those who know how to use it under hardship conditions.—*Marshall Lincoln, W7DQS, Wickenburg, Arizona*

THE CURSE OF THE VANITY CALLS

◆ In days gone by a call sign would tell you which area of the country an operator inhabited, and whether he was a relatively new ham or an old-timer. With the advent of the latest FCC abomination known as "vanity" call signs, all bets are off. Witness ARRL bulletin No. 2 of January 9, 1998, wherein a family of hams obtained vanity call signs, all with the same suffix, but with different numbers in the prefix!

It's becoming impossible to tell where a ham might be located from his/her call sign. This is causing substantial confusion on the air. Shame on the FCC! It needed to change its original method of call sign issuance like the powers-that-be needed many years ago to change the descriptive phrase, "cycles per second," to a meaningless proper name, Hertz. (Hertz had long since been honored when radio waves were named Hertzian waves.)—*Richard Shongut, W2QFR, New Rochelle, New York*

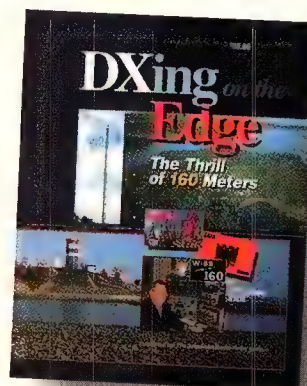
GET ON THE AIR WITH YOUR KIDS

◆ The mail came late this month, but that made me even more anxious to read the February *QST* when it finally arrived. As a new ham and father I echo the concerns that Bill Osler, WF0H, expressed in "Correspondence" about getting youth involved in Amateur Radio. I understand that there are many things kids are into today, but many of these activities are misdirected. As a 34-year-old parent of two, I recognize the importance of quality time with my children. In fact, my oldest daughter even helped me study for my first license. My example inspired her to get a license as well. Now she, KB9RWB, is a ham at age 10.

Bill is right. Ham radio is an activity that will expand the minds of our kids and grandkids. Kudos to WF0H, for attempting to get the family away from the TV! We adults are the one's letting our hobby down. Let's pick it back up by sharing our passion with some of the young ones. They are waiting for mom, dad, grandma and grandpa to share some of their lives with them. Can you find some time? I will.—*Tom Baugh, KB9RTK, Brookfield, Illinois*

QST

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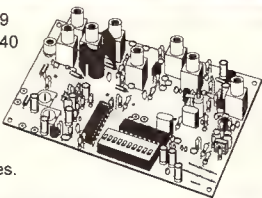
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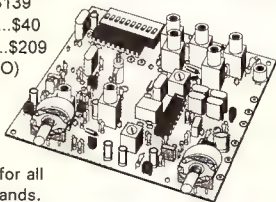
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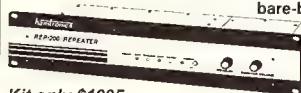
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This Month in Amateur Radio

Did you check the date on the cover? In case you missed it, this is the **April QST**. QST has an April tradition of tongue-in-cheek mischief. As you enjoy this issue, **look very closely**. Things are not always as they seem!

Oh, I wish I was in the land of cotton ...

The South rises again this month on the convention front. Very high frequency aficionados will be gathering in Atlanta for the **South-eastern VHF Conference**, April 3 and 4. On April 5 they'll be celebrating the **North Carolina State Convention** in Raleigh. Two weekends later, Birmingham, Alabama, hosts the **Southeastern Division Convention** (April 18-19). And the next weekend (whew!), the **Arkansas State Convention** gets underway in Little Rock (April 24-25).

Up North the Yankees will be gathering for the **Delaware State Convention** in New Castle, April 26. "Coming Conventions" has the details on all these April confabs and much more!

National Exam Days are coming—April 25 and 26!

This is the time to promote license classes, test sessions, and Amateur Radio in general. The ARRL public relations department has press kits ready for you right now. Just call Jennifer Gagne, N1TDY, Media Relations Assistant, at 860-594-0328, or e-mail jgagne@arrl.org. You can also check the ARRL Web site at <http://www.arrl.org/pio>.



Take your entire family to an exam session. You never know what will happen! Last year the Rich family (Barbara, KG0UT; 8 year-old daughter Rebecca, KB0VVT; and father David, KG0US) all passed their Amateur Extra exams *on the same day*.

There will be Nebraskans in abundance April 25 and 26 during the **Nebraska QSO Party**. Other "party" opportunities in April include the **QRP ARCI Spring QSO Party**, April 11 and 12; the **Michigan QSO Party**, April 18-20; and the **Florida QSO Party**, April 25 and 26. See "Contest Corral."

There are a number of unusual **special event operations** going on this month. One of our favorites is the K3DN operation at the **Shad Fest** in Lambertville, New Jersey, April 25. What is a shad, you say? It's a fish, none other than the tasty *alosa sapidissima*.

Of course, if you'd prefer something more sedate, try celebrating **National Library Week** by working KC8ELY from Millington, Michigan, on April 18. See "Special Events" in this issue.





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The Great Miquelon Kite Caper

Or, how we almost overstayed our welcome on Miquelon.



For a December DXpedition, St Pierre et Miquelon (FP) would not likely be your first choice. While it might sound like some sort of South Pacific tropical paradise, it's not—trust me. But we found it a super place to visit anyway, even without a radio.

Located just south of Newfoundland, the sparsely populated and largely barren islands—"the rocks" as St Pierre native Jean Pierre, FP5CJ, calls them—are a last vestige of French colonialism in North America. The historically savvy may recall St Pierre et Miquelon's role during Prohibition (see sidebar "St Pierre et Miquelon: The Capone Connection"). How I ended up tagging along on a DXpedition to that part of the world came down to being in the right place at the right time.

One morning last fall, Mel, W8MV,

Arrival in St Pierre! Left to right are Jean Pierre, FP5CJ, Rick, FP/N1RL, Mel, FP/WZ8A, and Andy, FP/W8MV. (All photos by the author)

turned up among the usual culprits on 40 meters looking for a CW op to join him on a DXpedition to FP for the ARRL 160-Meter Contest. He asked Bus, K4IX, if he could make the trip. Bus had other obligations and was unable to volunteer. I promptly made myself available. Mel's longtime friend Andy, WZ8A, also was able to sign on. This was to be my first crack at *being* DX in my 40 years of ham radio! Wow!

Mel had operated from SPM earlier in the

year, and I'd worked him on his first foray. So, he not only already had a reciprocal ticket, he had connections there, and even knew some French (mine is pretty minimal)! Most important, *he knew how to get there!* He was thus annointed our official DXpedition Leader.

On his earlier trip, Mel had quite successfully used a kite to support a light end-fed wire. The resulting vertical got out like gangbusters. The wind blows almost constantly on "the rocks," so Mel felt pretty confident that the huge kite-supported wire would lead to huge pileups and a commensurately huge score in the contest. That's not exactly how it worked out, but I'm getting ahead of myself.

We agreed to bring along two ICOM IC-706s (his and mine), a couple of notebook computers, various accessories, and—just in

case the wind died or the kites broke—some backup antennas. The plan was to have one station operating the contest while the other worked the higher bands. If you look on a map, you'll realize that SPM gives you a head start across the Atlantic, and we expected to be pretty popular on the Continent.

Despite tales of blasé French bureaucrats, the regulatory folks in Paris were pretty prompt about turning my application into a reciprocal license, but this process didn't come off without a few hitches. First off, you can't just write out a check for 100 francs—the fee for the reciprocal license, about \$18 at the time. And they don't take American Express—or VISA or MasterCard. My suggestion for those planning to operate from French territory is to go the International Postal Money Order (IPMO) route. It's the easiest and cheapest means (you'll pay *much* more at a bank), and it worked flawlessly.

But that wasn't the end of it. For some reason, when my reciprocal license arrived just weeks before our planned departure, it provided VHF privileges only! Arrgh! I almost panicked! Using what was likely very bad French, I faxed Paris, explaining that my US Extra ticket should be the equivalent of a CEPT Class 1 or French Group E license. Or, maybe I was insulting their mothers and telling them to stand outdoors in a heavy rain and suck wind. I wasn't really sure. As I said, my French is pretty sketchy.

A week later, the correct license arrived from Paris. I tucked my precious ticket safely away in my baggage where it remained as we crossed two international borders—twice. No one ever asked to see it or our radio gear. As we were to discover, any concerns about enforcement and regulation of Amateur Radio activity in SPM are well below the noise level.

The bottleneck on our journey would be the plane trip from St Pierre to Miquelon, the larger but far less populated island. By the time we packed the radios, power supplies, antennas, and long johns (not worn), we al-

ready were teetering on the brink in terms of baggage weight limitations. Still, we managed to drag along a lot of stuff, and used most of it—and especially the handful of clip leads I tossed in at the last minute (more on just why in a bit). To back up the kite antenna, I also threw in a quarter of a mile of electric fence wire and packed an Outbacker Outreach, which we planned to ground mount.

After arriving at Headquarters from Ohio, Mel and Andy spent the night at my QTH in Northern Connecticut. My wife looked on skeptically as we staged gear on the living room floor. Mel also gave us a photo and map tour of the territory we'd be visiting. The next morning, we set out for Halifax.

Once in Canada, we swapped some US dollars for Canadian, which—given the lopsided exchange rate—made us feel a bit richer (we took to calling the Canadian \$20 “a \$14 bill”). Because St Pierre et Miquelon is a department (or province) of France, the *franc* is the legal tender, but Canadian dollars are readily accepted.

About an hour and a quarter after leaving Halifax, we were setting down in St Pierre. Jean Pierre, FP5CJ, greeted us. A driver's license is sufficient to get past the border. We told Customs that we planned to operate Amateur Radio. They shook their heads and waved us through.

Our flight to Miquelon was only a few hours off. Jean Pierre gave us a whirlwind tour of St Pierre, including a stop at a local eatery and a souvenir shop. It was amazing! Just a little over an hour away from the familiarity of the US and Eastern Canada is this little piece of what almost passes for Europe. We all felt, well, like *foreigners*!

Too soon we were on a much smaller plane for the quick hop to Miquelon, along with maybe a half dozen other folks including Jean Pierre. We hitched a ride (it took two trips) in a too-small vehicle with a friend of Jean Pierre's to our operating site, Motel de Miquelon. The motel has served as a

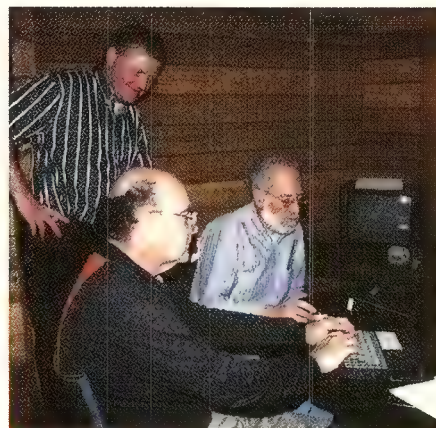
DXpedition site before, so if you're planning a trip, ask for Room 10. It's on the end nearest the beach.

It was getting a bit brisk, and some weather was on the horizon. To travel to St Pierre et Miquelon we had passed through two time zones. It was Friday afternoon, and the contest would start all too soon. Immediately upon checking out our surroundings, we got to work setting up our gear. Let the fun begin!

The Outbacker went on a mount that Mel had brought along. We arrayed maybe two dozen radials of aluminum wire around its base. Mel decided the wind was right for the delta kite. Before long, the kite antenna was high in the sky! As the kite swooped and sailed, Mel's auto tuner monitored the SWR



Kitemeister Mel tests the wind for the 3x3 parafoil.



FP5CJ looks on as Mel (right) and Andy put FP/W8MV on Top Band.



The author at FP/N1RL, a huge hit in Europe. Note the clip lead jumble near Rick's left hand.

St Pierre et Miquelon: The Capone Connection

The Prohibition Era provided a big boost to the economy of St Pierre et Miquelon. Back then, Canada passed a law prohibiting the exporting of liquor to this country. But just two years after the Volstead Act became law in 1920, France lifted its prohibition against importing foreign spirits, creating a bonanza for St Pierre. Chicago gangster Al Capone personally went to St Pierre to supervise the construction of massive warehouses there to store Canadian liquor that would eventually find its way into US speakeasies, courtesy of the rum runners who plied the Canadian and New England coastlines. Additionally, the rum runners—and especially their high-speed boats—generated a lot of business for St Pierre in the marine trades. Major distilleries eventually set up warehouses and distribution facilities on the islands.

Because of his role, Al Capone became a local folk hero in St Pierre et Miquelon. Even today, you'll find an Al Capone Bar and an Al Capone Museum. In 1996, SPM had an Al Capone Day and people dressed up in pin-stripe suits, put carnations in their lapels, and smoked big cigars.

When the US repealed Prohibition in 1933, the St Pierre and Miquelon economy went into a deep recession, and, eventually, the islanders turned back to fishing. Now, there is a moratorium on cod fishing, so the province is trying to promote tourism (even hams are welcome). With its relative inaccessibility and climate, only about 20,000 outsiders visit the islands annually. Rumor has it that the smuggling of spirits into Canada is fairly prevalent today. Because St Pierre is a free port, booze can be purchased for about one-third of the cost in Canada, then smuggled by boat into Newfoundland.—Mel Vye, W8MV, and Rick Lindquist, N1RL

swings and kept the IC-706 happy.

Quite possibly, our efforts to adapt to the 230 V ac power system there resulted in zapping my IC-706. Perhaps we should have taken the hint after getting "bit" from touching the computer and the keyer at the same time. We discovered after we'd set it up to have CT key the radio that the '706 locked in transmit in CW mode. Mel made an executive decision to dispense with computer keying and hooked up a set of paddles instead. We just used the computers for logging. I faced the prospect of operating only SSB on my IC-706. *Sacré bleu!*

Motel de Miquelon has a very nice little restaurant where we grabbed a bite of dinner so we'd be ready to contest. The menu was in French. The waitress (and nearly everyone else in the dining room) spoke only French. We muddled through and made our wants known. My Miquelon version of pizza bore only a faint resemblance to what you'd expect in the US, but it was terrific! My French pronunciation apparently was not. Once, I asked the waitress for butter (*beurre*); I got beer (*bière*—also a French word for "coffin," by the way). Not that I complained.

Though frustrated, I determined to figure out a way to use my compromised IC-706 on CW. While Mel and Andy plunged ahead on 160 meters, I discovered my radio was not *completely* broken after all. For some reason known best to its designers (bless you!), the IC-706 lets you send CW using the **UP** and **DN** buttons on the mike as keyer paddles. This mode still worked! Here's where those clip leads come in. Using the buttons to send takes practice. So, I disassembled the mike, clipped onto the **UP** and **DN** button connections, and wired up a keyer paddle. *Voilà!* This setup got me through some 900 CW contacts.

As long as the kite stayed in the air, Mel and Andy were able to rack up some points on 160. Conditions were not ideal—a front was moving in our direction, and things were noisy—but FP/W8MV was being heard and worked on Top Band. Meanwhile, across the room at FP/N1RL, I fired up the jury-rigged IC-706 into the Outbacker and incited a pileup on 40 meters. *Waaaay* cool!

The vast majority of the stations we worked were Europeans. Occasional efforts to get the clamoring throng to stand by for US stations were in vain. Installing a new 250-Hz CW filter in the '706 turned out to have been a wise decision, but the din was absolutely horrendous. I listened "up," but everyone seemed to wind up on exactly the same frequency. Only the very loud survived.

I fell into the practice of checking the pileup fringes—first higher, then lower—before going back to the middle. Some of the "little guys"—QRPers and mobiles—were wise enough to keep out of the mob's direct path, so they wound up in my log while stronger signals got trampled beyond recognition.

For many years, I've kept a weekly sked on 40-meter SSB. That Saturday morning—after successful runs on 80, 40, and 20 CW—I fired up at the appointed hour on the usual frequency. It took a bit of shouting to get recognized, but my friend, Charlie, N4AV, in Florida was the first to get into the FP/N1RL

log on SSB. The others in the group—including a mobile in Virginia—also managed to hear my 100 W into the Outbacker vertical and exchange reports. I blended in so well that no other stations broke in for a report.

I also checked in with the usual culprits on 40 CW. Unfortunately, we never did work Bus, K4IX, but Roy, K6XK, in Iowa, managed to copy me. At this point, the sun already was high in the sky at our QTH. Or, it would



A beautiful sight!
The six-foot delta—
just a dot in the sky
above our motel—
supports the
270-foot FP/W8MV
endfed wire.



Sightseeing! A horse grazes along the shore of the isthmus connecting Miquelon and Langlade.



have been had it been clear. The weather had turned on us, and it had begun to rain.

The first night, the kite held for several hours until the wind changed and died. Then, it dropped like a stone. It was up sporadically after that. By Saturday morning, flying the kite became impossible, despite our best efforts. Rain continued into the evening. Getting out on 160 with the Outbacker was rough going. We made a few contacts, but, under the prevailing conditions, it was obvious we were very weak or below noise level state-side. Using the aluminum electric fence wire, I rigged up a longwire. Miquelon is nearly devoid of trees, so I made do with an old wooden ladder on one end and a long piece of wood propped up by rocks on the other. This worked surprisingly well.

As the weather began to clear, Mel and I tried to use the parafoil, but it tore in the gusty winds. We taped it up and tried again, but it was to no avail, and the kite eventually was destroyed. Mel's analysis: Too little wind the first day for the delta and too much wind (an understatement) the second day for the parafoil. Mel and Andy rigged up another (low) end-fed wire, which seemed to get out pretty well. They logged more than 200 contest contacts and 600 or so outside the contest.

Since the contest wrapped up Sunday morning, we had a little breather to do some sightseeing. We all were pretty radioed out at that point anyway. Besides, we had not yet sampled the escargot. *Magnifique!*

Later, with an hour or so to spare, we put some last-gasp contacts into the log, then raced around tearing down antennas and packing our gear to prepare for the ferry ride back to St Pierre where we would spend the night before flying to Halifax. As it turned out, we didn't have that "spare" hour after all and almost missed the ferry! We thought it left at 7 PM, but our ride arrived at 6:30 to tell us it was ready to go and that Jean Pierre had convinced the ferry skipper to delay departure until we got there. Somehow, we *all* managed to fit into the too-small vehicle for the trip to the dock. We slept very well in St Pierre.

Even in early December, St Pierre et Miquelon was a delightful spot to visit, and it's an excellent DXpedition location. We're all looking forward to our next opportunity—just as soon as the QSLing is out of the way from this trip. Meanwhile, I'm stocking up on clip leads—just in case.

Just as this article went to press, I received a refund of my 100 franc reciprocal license fee. Maybe my French wasn't so bad after all!

An unofficial St Pierre et Miquelon Web site is at <http://205.250.151.22/encyspmweb/english.html>. **QST**

A Practical, Personal History of Call Sign License Plates



Collecting Amateur Radio call sign license plates has been a steady sideline for years. But one ham's quest to collect "first year of issue" plates from all 50 states went way beyond casual. It took determined sleuthing, which uncovered fascinating historical details about ham plates and how they were issued.

After writing an article about call sign license plates for the January 1995 issue of *QST*, I thought it would be interesting to assemble a collection of "first year of issue" ham plates from all 50 states. Such collections have been attempted by others, but I've never heard of one being successfully completed. It's not something for the *Guinness Book of World Records*, but it's an important part of Amateur Radio history nonetheless.

There are some problems associated with collecting "first year of issue" ham plates. Many states issued their first ham plates in small numbers—perhaps because many states had relatively few licensed Amateur Radio operators at the time. Not many hams chose to pay the extra fees required to obtain special call sign license plates. And many states restricted the use of ham plates during the Cold War period to communication emergencies. Some states required operators to install mobile radio gear in cars displaying the special plates. Several first year of issue ham plates are 45 years old, which makes the original owners at least 65 years old. Most are now Silent Keys, and their prized plates were often discarded after their deaths. Besides,

how many people save expired auto license plates, anyway?

Personal Treasures

I have to thank the many thoughtful hams who helped me compile this unprecedented collection. Without their help it would have been impossible. A few plates were received from family members of Silent Keys, who donated the plates to my collection in the deceased ham's memory. I can sympathize with some who would not part with their first ham plates: Being a ham myself, I might feel the same way! I offered to pay a "reasonable price" to anyone who had a sentimental attachment to their vintage ham plates, but fewer than 5% wanted more than the cost of shipping, which generally totaled less than \$2. Many wanted nothing in exchange and were delighted to add their plates to this prestigious collection (but I always reimbursed them for any expenses). Two hams priced their prized plates at \$1000 each—which let me know in very certain terms that they were reluctant to part with them!

One Old Timer in his 90s misunderstood my request and sent me his original 1951 FCC Amateur Radio license. He hoped it would fit my needs. I returned the ham

ticket to him with my thanks for his interest in helping me, along with a thorough explanation of what I was trying to collect. Two other Old Timers, also in their 90s, donated their first ham plates to my project, saying their plates would have "better homes" in my collection rather than facing an uncertain future. One ham sent me his first year plate along with 27 other plates he'd received in successive years!

One first year of issue ham plate was sent to me by the widow of a Silent Key who asked that the plate be added to my collection in her husband's memory. The only problem was that the plate had been repainted in silver, with his call sign in black. He had displayed this expired ham plate on a second vehicle and did not want to be stopped by the authorities for using an expired plate! I tried a little lacquer thinner on the back of the plate and found that it removed his paint without affecting the original paint (most likely a durable enamel). Under his workmanship I found an impressive first year plate for my collection. Unfortunately, I did not have the foresight to photograph his handiwork, which had protected the plate for many years.

Almost every plate in my collection has a personal story associated with it. One

Table 1

**Amateur Radio Plates—
First Years of Issue**

1939	Michigan
1950	Florida, Mississippi
1951	Arkansas, Georgia, Louisiana, Nevada, North Dakota, Tennessee, Virginia
1952	Alabama, Alaska, Minnesota, Missouri, Nebraska, Wisconsin
1953	Delaware, New Mexico, Ohio, South Dakota
1954	California, Indiana, Iowa, Kansas, Michigan, Oregon, Texas
1955	Arizona, Connecticut, Hawaii, North Carolina, Utah
1956	Illinois, Maryland, Pennsylvania, South Carolina
1957	Idaho, New Hampshire, Washington
1958	Colorado, Montana, Oklahoma, Rhode Island, Vermont
1960	West Virginia, Wyoming
1962	Maine
1963	New York
1964	District of Columbia
1965	Massachusetts
1968	New Jersey
1973	Kentucky

plate came from a judge who asked me to excuse its poor paint job: It had been manufactured by a rather unmotivated worker at the state prison. I assumed that the judge himself was responsible for incarcerating his plate's painter, which may explain the quality control issue!

Another plate came from the wife of a ham who was terminally ill. She found my letter intriguing, and remembered recently seeing the plate I had described among her husband's "radio junk." She sent me one of his first-year plates for my collection and said that the matching plate would be buried with her husband upon his death. I'm not a highly emotional person, but this letter brought me close to tears as I regarded her husband as a fellow ham. His call sign was recently listed in the Silent Keys column.

Detective Work!

Most of the information about first year of issue ham plates was gained at the rather extensive ham radio library at ARRL HQ in Newington, Connecticut. In searching *QST* from 1937 through 1973, I discovered that some of the information I had obtained from Old Timers wasn't always reliable. Perhaps time does have a way of clouding memories! A few helpful hams sent me copies of legislation authorizing ham plates in their states. In some cases, it seems, passing laws allowing ham plates wasn't always directly followed by action on the part of motor vehicle authorities in providing them. A good example is Oklahoma, where

the call sign plate bill was signed into law in mid-1953, but plates weren't available until 1958.

I'd heard stories of Oklahoma ham plates showing up as early as 1938, and I even found a few confirmations of the mysterious black-on-yellow '38 plates, but I was unable to confirm them as "official," so I have to assume they were souvenirs.

The first Amateur Radio license plates were issued in Michigan in 1939. The Great Lakes Amateur Radio Telephone Association of Detroit, under the leadership of James Strang, W8NFR, proposed the special ham operator plates. The group petitioned Secretary of State Leon D. Case to grant the request under legislation that allowed a maximum of three letters and three numbers. The 1939 issues were actually vanity-type plates, and 500 or fewer were issued to hams (see March 1939 *QST*). After the first year, officials felt that the system was an administrative burden, and the state stopped issuing the plates the following year. Michigan hams had to wait until 1954 to receive official call sign license plates.

The next call sign plate issued was a 1950 Florida plate that is generally considered to be the first "true" ham plate. The Florida plates were made possible through the efforts of Florida State Senator Lloyd F. Boyle, W4IMJ (see January 1950 *QST*), and Eddie Collins, W4MS, a good friend of mine. I was unaware of Eddie's achievement until after his death. Mississippi followed Florida by issuing ham plates in November of 1950 (they expired, however, in October of 1951).

Rarest of the Rare?

I consider the key plate in this collection to be the 1951 Nevada plate, since there were only 182 hams licensed in Nevada during 1951, and only 30 of them are now listed in the 1997 *Radio Amateur Callbook* as still living in Nevada. The remaining 152 ops have become Silent Keys, moved to other FCC districts, upgraded their class of license and requested new call signs, or had given up Amateur Radio in the intervening years. None of the present-day Nevada hams were able to help me find a 1951 Nevada ham plate.

At the start of my search, the only 1951 Nevada ham plates known belonged to a California plate collector and a Nevada ham who is the original owner. I managed to find a California ham who had left Nevada in 1952. He eventually gave up Amateur Radio for 10 years and let his license expire. After his retirement he retook the FCC exam and got back into ham radio with a new call sign. Thanks to modern technology I was able to locate him on a CD-ROM call sign directory. He felt that his ham plate was better in my collection rather than hanging on his garage wall where it had been for the past 44 years!

The last plate I was able to locate to complete this unique collection was the 1950 Mississippi issue. There were 535 hams licensed in Mississippi at the close of



Author Mike Ludkiewicz, W1DGJ, with 1950 Florida and 1939 Michigan plates. The Florida plate is considered the first "true" ham plate issued in the US.



A 1958 Montana plate with PRISON MADE embossed along the left edge.

1950, and I was able to find 210 of them still licensed (there or in other states). Many acknowledged having had a 1950 Mississippi ham plate, but only one ham had retained his original. Perhaps the 1950 Mississippi plate is the rarest in this unusual collection? I was very fortunate that W5PUI decided to donate his so I could complete my compilation.

I believe this collection of first year of issue ham plates from the 50 states and the District of Columbia may never be duplicated. The scarcity of some plates in this collection will be further enhanced with time. The original owners who kept them for personal reasons will pass on, and their old expired plates will be thrown away.

Tidbits

Six states used radio slogans on their first-year ham plates. The 1951 Arkansas design used AMATEUR RADIO; the 1957 Idaho plates used RADIO AMATEUR; the 1956 Illinois issue used AMATEUR RADIO; the 1973 Kentucky offering used AM. RADIO; the 1951 Tennessee used RADIO; and the 1954 Texas call sign plates used AMATEUR RADIO OPR.

Alaska and Hawaii were US territories when they issued their first ham plates. In 1973, Kentucky became the last of the 50 states to issue Amateur Radio call sign plates.

Mike can be reached at 143 Richmond Rd, Ludlow, MA 01056.



A Low-Cost, Broadband Mobile Antenna

If your primary goal in life is to achieve the fabled 1:1 SWR on all bands, this antenna is for you!

The most frustrating thing about operating HF mobile is the inability to easily change frequencies and bands while driving. On the lower bands (160/80/40 meters), you have to stop and retune your antenna as you move within a given band since the operating bandwidth is so small. And then, of course, you have to stop and change antennas or coil taps to go from band-to-band. I've tried various "screwdriver" antennas, but they're big and still kind of a hassle to tune while driving. However, I've recently come up with a broadband (1.8 to 450 MHz) mobile antenna that requires no tuning and will cost you less than \$100! Interested?

Flashback and Forward

The idea for this antenna actually came to me as I was reminiscing about my early years in ham radio. I started out my Novice days with a used Heathkit DX-40 transmitter

that I obtained without the instruction manual. It seemed to make sense to me that I should adjust the transmitter for maximum plate current to get maximum power. After all, when I tuned up the radio this way, the 6146 output tube would glow very brightly!

After a few weeks of making no contacts, I connected a light bulb to the transmitter output and found that minimum plate current corresponded to maximum transmitter power (even though this makes no sense at all—kind of like perpetual motion). However, while I was testing, I did make a local CW contact just using the light bulb as an antenna. I guess the filament in the bulb was acting as a "short wire" antenna.

Now back to today. At a recent sidewalk sale, I picked up an MFJ-764 dry dummy load. This unit will handle 100 W continuously, and 1500 W for a few seconds at a time. I noticed that the dummy load had slots all over it. Since I know that there is

such a thing as a "slot" antenna, and remembering my Novice light bulb contact, I decided to try to make a mobile antenna utilizing this device.

Construction

Start with a $\frac{3}{8}$ -inch diameter copper pipe seven feet long. Solder one end into a standard PL-259 connector. Use silver solder and a torch as this needs to be a strong connection. Since you will eventually need a second PL-259 mounted on this tube, now is a good time to put both PL-259 shells over the copper tube.

Next, remove the outside dielectric and shield from a piece of RG-213. Insert the remaining dielectric and center conductor of the RG-213 coax through the copper tube into the soldered-on PL-259. Solder the center conductor to the PL-259 center pin. Now, mount the second PL-259 on the copper tube and solder the copper tube to the body. Solder the center conductor to the PL-259 center pin (see Figure 1). Now attach the MFJ-764 to the PL-259 at one end of the pipe, and attach the other end to your SO-239 mobile mount.

Conclusion

This amazing antenna has allowed me to get on the air and enjoy hamming again for the first time in years. Mobile operation is a breeze since the antenna seems to virtually eliminate ignition noise and other annoying garbage from my receiver—along with many annoying conversations. All that issues from my speaker is a soft, soothing hiss. I also enjoy 1:1 SWRs from 160 meters through 70 cm!

Now that I'm active once again, I notice that the bands seem awfully quiet; I hear very few signals at all. Still, I'm optimistic that things will pick up as solar activity increases over the next few years. See you on the air and on the road!

You can contact Phil, AD5X, at 1517 Creekside Drive, Richardson TX 75081 or e-mail him at psalas@aud.alcatel.com

QST

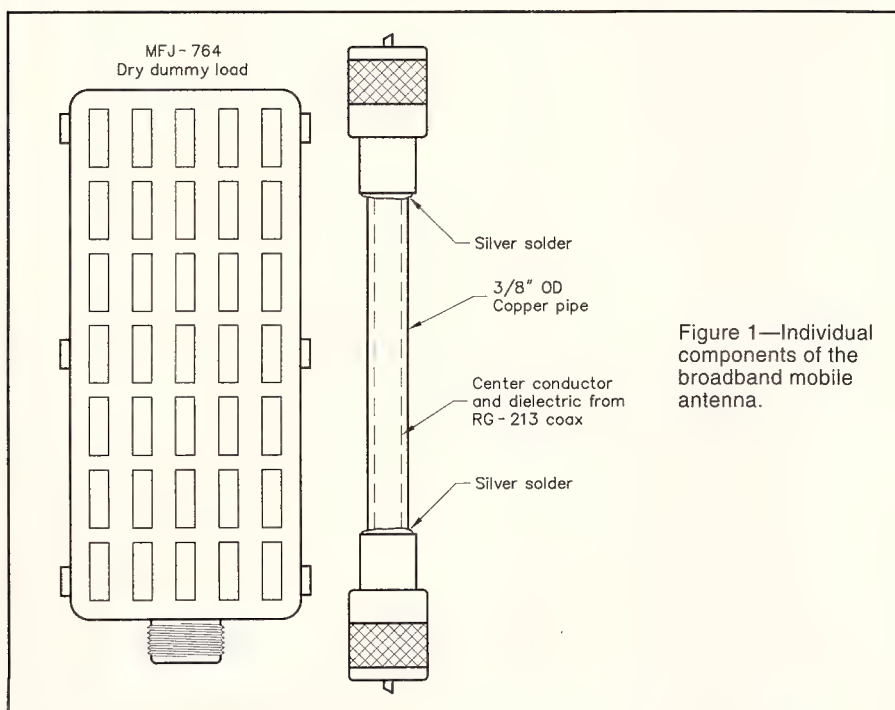


Figure 1—Individual components of the broadband mobile antenna.

High-Speed CW and Meteor Scatter—An Exciting VHF DX Medium!

European hams have been bouncing ultra-high-speed CW signals off the fiery trails of meteors for years. Now American hams are discovering the excitement. You don't need a super VHF station, you don't have to be a CW whiz and you don't even need to wait for a meteor shower!

Does your 2-meter all-mode radio stay tuned to 144.200 MHz most of the time, generating the all-too-familiar white noise of an idle band? Do you occasionally call CQ only to be rewarded by the same white-noise response? Tropo openings aren't everyday occurrences on 2 meters, and E-skip conditions are all but nonexistent.

How would you like to put your all-mode radio to work making DX contacts whenever you want? All you need is a good dose of persistence and an introduction to high-speed CW (HSCW) via meteor scatter (MS). Since I began using this mode in November 1997, it has put excitement back into my weak-signal VHF operations. My HSCW station is modest: a Yaesu FT-290 mobile/portable all-mode transceiver driving a 100 W brick amp into a Cushcraft 17B2 Yagi antenna. If you are a VHF DX hound/grid hunter, then this may be just the thing to fuel your fire.

HSCW is Not New!

HSCW has been in use in Europe for a couple of decades. European VHFers often work three or four different stations per hour, without the benefit of a meteor shower, using this mode. During major meteor showers, several DXpeditions may be conducted by teams of operators to activate rare grid squares throughout Europe and western Asia. Grid hunting with HSCW is very popular there. One operator notes that he has worked "...hundreds of new grids (now at #651...) over the years." HSCW activity has been described several times in the pages of *QST*.²

This sounded like something I really wanted to try. But, I wondered, how could it be possible to work new grids on 144 MHz at almost any hour, almost every day? In order to understand, I first had to learn a little bit about how QSOs are made using meteor scatter. Let's begin our quest for "anytime VHF DX" with a brief review of meteors themselves.

Space Invaders

Meteors are small particles of matter, most only the size of a grain of sand. Some are the leftovers from the formation of our Solar System; others are thrown off by celestial bodies such as comets. When the Earth passes through a high concentration of cosmic debris, we have a meteor shower.

The secret of HSCW meteor-scatter success is the fact that debris is falling into our atmosphere *constantly*. The Earth sweeps up hundreds of tons of space matter each year. On any given day, over 12 billion meteors impact the atmosphere! The vast majority of these meteors are what are called "sporadic," or random, meteors because they aren't numerous enough to be noted as a shower. The large number of these random meteors makes it possible for you to work new VHF DX almost whenever you want.

Meteors enter the atmosphere and begin burning at heights ranging from 110 to 100 km (66 to 60 miles), depending on how fast they enter. This is about the same height as the E layer of the ionosphere, the region of our atmosphere that gives us our familiar E-skip openings! Thus, the distance over which we can work is about the same for both meteor scatter and E skip. The faster the meteors enter, the more quickly they

incinerate (and at higher altitudes).

As meteors burn up in the atmosphere, they form either *underdense* or *overdense* trails. Overdense trails typically create ionization so intense that, to radio waves, the trail looks like a cylindrical metallic reflector. These trails strongly reflect radio signals, sometimes for as long as a minute or more, even long enough to complete several contacts using SSB. Unfortunately, overdense trails and the "bursts" they produce are uncommon except near the peaks of meteor showers.

Underdense meteor trails, on the other hand, provide only very short reflections (commonly called *pings*). The ionized trail tends to scatter radio signals rather than reflecting them. While underdense trails only last a fraction of a second and seldom reflect more than a syllable or two of voice, they are extremely common. As you're reading this sentence, multitudes of underdense trails are flashing into existence miles above your head, then disappearing.

Fast-burning underdense meteor trails were discovered by the first ham operators to make 2-meter contacts via meteor scatter. They used high CW keying speeds in their tests. The keying speeds were well beyond what any human could possibly decipher, so they recorded the signals on audiotape and reduced the speed by 50% or more for decoding. They soon learned that these short-lived meteor trails could be used to relay quick bursts of information.

HSCW—How Fast is "Fast"?

Having been absent from ham radio for more than 20 years, I was curious how "weak signal" VHF work had changed. I first found

¹Notes appear on page 39.

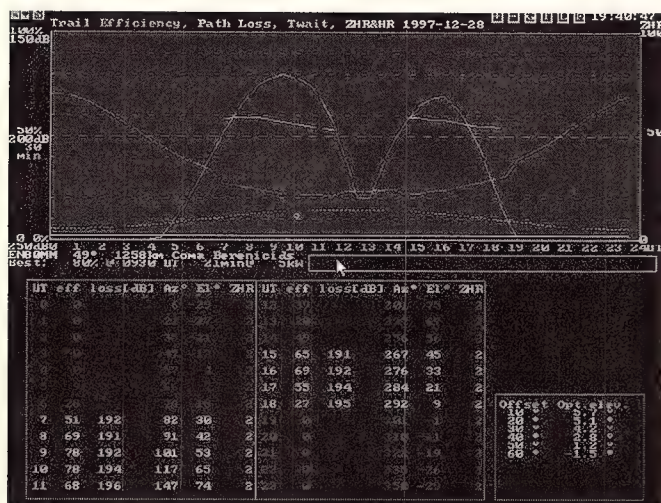


Figure 1—The *MSSOFT* "geometry" screen displays data such as meteor trail efficiency, path loss, azimuth and elevation of the shower, beam heading and distance to station. The data can be changed easily from this screen to watch the changes occur in the shower geometry. The distant station's "locator" or grid can also be changed to recalculate a new set of values.



Figure 2—*MS DSP*, written by Tihomir Heidelberg, 9A4GL, is popular among HSCW operators. Above the digital clock is the main receive buffer. When a burst is heard, the operator marks the buffer spot and saves the burst to one of eight buffers above. During the next transmit period the saved buffer areas are replayed while varying the speed and tone with controls to the left. Transmit data is changed (lower left) and selected as necessary (lower right).

references to HSCW while browsing the Internet. Time after time, I encountered Web sites mentioning this "new" mode of communication using meteor scatter, with some site authors making astonishing claims of working new grids on 144 MHz almost every day! This mode of communication was more successful than anything I had ever heard of. One operator commented, "...you don't need major showers for an MS QSO! If I make a sked for tonight or tomorrow morning in the 650-1000 mile range, we are 95% sure to complete the contact."³ The more I read, the more eager I became to try this "new" mode.

Just how fast is HSCW? Here are some typical examples for comparison:

Conversational CW	15 WPM
Contest-style CW	30 WPM
SSB	200 WPM
Slow HSCW	200 WPM
Fast HSCW	800 WPM
Very fast HSCW	1200 WPM
Ultra fast HSCW	1600 WPM

You can see that even slow HSCW is just as fast as most SSB operators care to speak, except, possibly, those whose occupation is auctioneering!

Hardware and Software

Traditional hardware for HSCW calls for modified tape recorders for recording and slowing down received signals, and memory keyers (with audio oscillators for tone-injection keying) for transmitting high-speed CW. There are hardware interface circuits readily available to utilize such equipment.⁴ With my background in computers, I was immediately interested in the newly available software offered as shareware. I had just purchased a new state-of-the-art com-

puter complete with a true SoundBlaster sound card, which I had little doubt would work for this application, and so I decided to try the computer method. (As you'll see later on, however, you don't need a powerful PC like mine to work HSCW.)

As I surfed the Web it became apparent that there were several ways to transmit and receive HSCW using ordinary home computers. At first I had a concern about whether my rig could handle such fast keying speeds; but then I found that most hams were keying their rigs by injecting a keyed 2000 Hz tone directly into the mike jack while operating in the USB (upper sideband) mode. This is mode *J2A* and is virtually equivalent to pure CW.

There are programs that will handle the transmitter keying only and do not need a sound card, although an audio oscillator and a simple interface are required. One such program is *MSSOFT* by Ilkka Yrjola, OH5IY.⁵ This shareware program also features an MS scheduler, whereby upcoming schedules may be entered and even integrated into an automatic transmit sequence. Another highlight of this program is the fantastic MS path efficiency analysis section (see Figure 1). The documentation that comes with *MSSOFT* is a good education on both the program itself and meteor scatter work in general.

Another program, written by Al Van Buren, K7CA, sends a keyed tone to the computer's speaker, which can be tapped off and fed into the mike jack.⁶ Still another way to go is to use a memory keyer, such as the CMOS Super Keyer, which is capable of up to 4950 LPM (*QST*, August 1995), coupled with a suitable audio oscillator.⁴ The keyer will take care of the transmit side and a modified cassette tape recorder can

handle the receive recording duty. European experience dictates that the modified cassette tape recorder method will work up to a speed of approximately 1500 LPM. There is a German digital tape recorder now available that a number of Europeans are using.⁸ As none are in use over here, it is not known how well this device will work for North American style HSCW operation. I should also mention that there is a group of dedicated US operators who are studying the possibility of developing affordable non-computer hardware to operate HSCW.

When it comes to computer programs, which handle both transmit and receive simultaneously on one machine, there are few choices at the present time. However, this method appears to be the best for most computer-equipped North American hams.

The program that is currently used by the majority of those on HSCW in North America is *MS DSP* (see Figure 2).⁷ This is a DOS-only program that uses the Creative Labs SoundBlaster-series sound cards to convert and record the received signal, save operator-marked pings, and allow the immediate playback of the saved signals at reduced speed (no tape recorders necessary!). The replay speed can be varied by a factor of up to 60 times, which could slow a 480 WPM ping down to as slow as 8 WPM, 1000 WPM ping down to about 16 WPM, or a 1700 WPM ping to about 30 WPM! It features an "up-converter" that heterodynes the very low audio pitch of the slowed-down CW note to a tone more easily heard. While the saved signals are being reviewed, this program is also transmitting the operator's data. The many functions of this program can be controlled by either the keyboard or mouse, and transmit speeds of up to 1700 WPM are possible. Data to be transmitted is

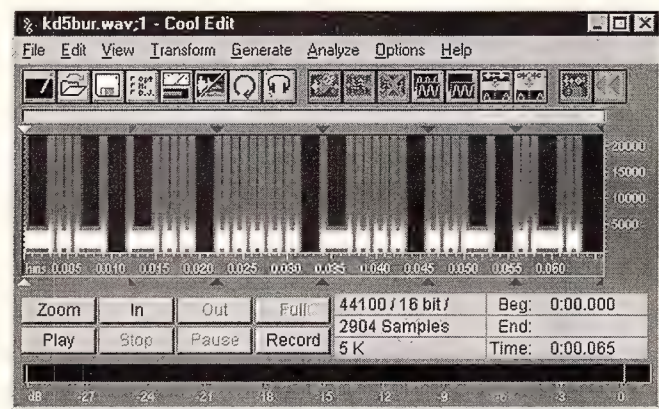


Figure 3—CoolEdit 96, an audio WAV file editor, allows the creation of files to be used during transmit periods. Here, my call has been assembled by pasting together the six individual character WAV files. A complete library of character files can be obtained as freeware from KØSM (see text).

simply typed in from the keyboard and may be modified at any time during the sked.

MS DSP produces its own keyed tones with the SoundBlaster audio board and thus does not require an external audio oscillator to drive the transmitter. Information on interfacing it with the transmitter, which may amount to no more than an audio line with a series capacitor, can be found on one or more Web sites.⁴ This program runs under DOS 6.0 or higher only, although it may also run in a DOS window of *Windows 95* on some computers. It requires a '386 or better processor, 4 MB RAM, a VGA graphics card, and a Creative Labs SoundBlaster-series audio card. Like other DSP-type programs, this card must be a *true* SoundBlaster card. *Clones will not work!* Written by Tihomir Heidelberg, 9A4GL, *MS DSP* is available as shareware.⁷ The version currently in use V. 0.51, is a beta version, with several known bugs in it. In particular, it will not run on a few seemingly compatible computers even with true SoundBlaster cards. In spite of the bugs, this has become the HSCW workhorse of the Western Hemisphere. 9A4GL is planning to write an entirely new version later this year, which will run under *Windows 95/NT* only. And as this article was going to press, it was announced that an entirely new DOS version was nearly ready for release in a beta version. This new version seems to have eliminated most of the bugs that plagued the previous releases, and it will also run under a full-screen DOS window of *Windows 3.1x*. It is expected that the improved and further enhanced *MS DSP* V. 6.x will probably be available on his Web site by the time this article is in print.

For those who cannot run *MS DSP*, a much simpler, receive-only program is *SBMS* (SoundBlaster Meteor Scatter), by DL3JIN.⁸ A DOS program, it will also run in a full-screen window under *Windows 3.1* (and probably *Windows 95*) and also requires a SoundBlaster board, although at least one clone has been found to work. This program does not have many of the "bells and whistles" of *MS DSP*, and it does not

have a transmit (keying) section. But this was the program that started HSCW in North America, and it remains a good choice, especially if you already have a method of generating high speed code or have problems running *MS DSP*.

Another program in use is *CoolEdit 96*. This commercial product requires *Windows 95*, and is available in a shareware version direct from the Syntrium homepage.⁹ I decided to use *CoolEdit 96* simply because it was the easiest and fastest to get going for me. This is *not* an HSCW program, but allows you to manipulate audio WAV files in much the same way a paint program works with image files. It is an extremely handy addition to use with the other software packages we've discussed.

My Experiences

I began my foray into HSCW by downloading the individual files needed to build up the data I would need to transmit at the proper times. Next I customized the files for

my station by opening and editing each one (Figure 3). I then made up a "switch-box" as suggested by Andy Flowers, KØSM (Figure 4). This is a basic computer-to-radio connection with a switch on the front that pulls the PTT line to ground. Finally, it was time to put everything together and see if it worked.

After tweaking the sound-card for a while, I was ready to conduct some local tests. I sent a blast of HSCW and a friend across town recorded my signal and played it back to me on FM simplex. It sounded unlike anything I had ever heard! My software processed it and there was my CW, as real as life. I felt like I was ready for the big test, a real sked via MS! One e-mail message was all it took. I would meet with Shelby Ennis, W8WN, on Monday and Thursday mornings.

Many of you have run schedules during the major meteor showers. For those who have not, a schedule or "sked" is an agreement between two stations that will attempt

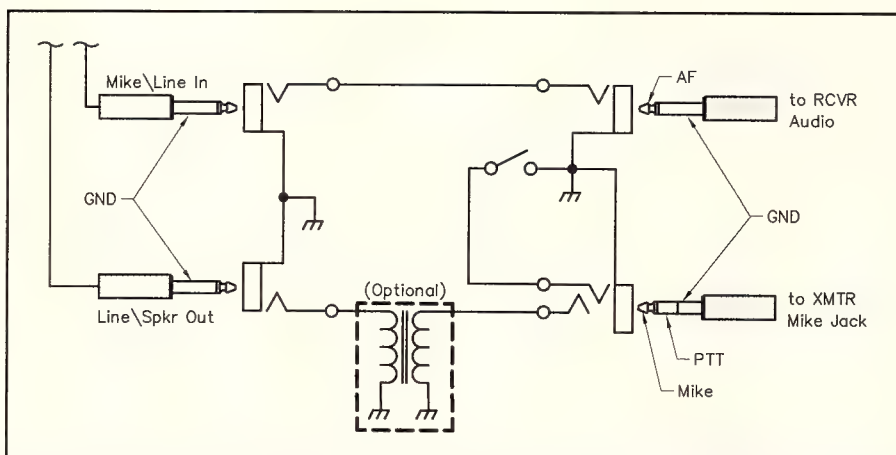


Figure 4—The HSCW interface box by KØSM. This is simply a way to organize the cables and place the PTT function at your fingertips. An optional isolation transformer (Radio Shack 273-1374) may be included. Shielded cable is preferred.

Web Resources

Note: Server operation can vary. If you have difficulty connecting, try again later.

Meteors, MS, HSMS, Computers and Amateur Radio, http://www.nitehawk.com/rasmit/ws1_15.html

N1BUG Ham Radio World, <http://www.qsl.net/n1bug/>

N7STU HSCW page, <http://www.qsl.net/n7stu/hscw.html>

9A4GL homepage, <http://www.qsl.net/9a4gl/>

OH5IY homepage, <http://www.sci.fi/~oh5iy/>

KØSM HSCW page, <http://www.qsl.net/k0sm/ms.htm>

Make More Miles on VHF, <http://fs1.ilke.de/sites/gap>

W6AMT Meteor Scatter Page, <http://www.amt.org/Meteor%20Scatter/>

W3SE HSCW page, <http://www.qsl.net/w3se>

KBØVUK HSCW page, <http://www.qsl.net/kb0vuk/hsms.html>

WA6TBO page, <http://www.qsl.net/wa6tbo/hsms.htm>

HSMS—Frequently Asked Questions

(Note that the procedures and standards discussed here are based upon North American HSCW operation, which sometimes differs from European HSCW MS).

What is HSCW?

HSCW (or HSMS) is the technique of using very-high-speed Morse code CW to communicate and exchange short bits of information by using the many underdense "pings" caused by tiny meteors that constantly bombard our atmosphere.

How does this differ from SSB meteor-scatter operation?

During the peak of a major shower, when overdense trails produce frequent signals for several seconds, short-sequence or break-in SSB may be more efficient. But at all other times, when overdense trails are not available, HSCW is able to use the occasional underdense fractional-second pings to transmit the information.

So just how short can these pings be and still get usable information across?

Very short! In fact, for HSCW, pings or bursts longer than two or three seconds are exciting but are almost a nuisance! We'll leave it up to you to do the actual math. But a $1/10$ second ping can propagate a complete set of calls at the medium or higher speeds!

You can't copy that by ear! And the CW decoders I've seen couldn't handle anything like this.

Right. The idea is simple. Use a device (usually software) to slow the code down to a readable speed. Then copy it by ear.

So the machine does all the work?

Hardly! It takes the incoming signal, saves it, slows it down, plays it back at a slower speed (and possibly heterodynes it to a higher pitch for easier copying). The operator must still do the actual decoding of the signal. The computer or other device slows the speed down, but it is still up to the operator to dig it out of the noise and actually copy it! While a machine could no doubt be built to do this, the technical requirements would be very tight because most pings are few, weak, and very short. The brain substitutes for all of this expensive and unavailable equipment!

How do you key the transmitter?

Few rigs can be keyed in standard fashion at much more than 100 WPM; some won't sound good even that fast. The standard practice is to key a pure 2000-Hz audio tone and inject this into the mike jack.

So is this actually SSB, MCW or what?

It's CW, but with the zero-beat frequency offset from the dial reading by 2 kHz (with a 2000-Hz tone injected into the mike jack). Recall that on SSB, a single, continuous tone creates a steady output. Key this tone on and off and you effectively switch the rig's output between 100% (or whatever you have selected) and zero. That's the same as an on/off keyed CW signal!

You say your actual transmit frequency is offset from the dial reading? Isn't that confusing?

Yes, it can be, and this cannot be helped. But remember, when you switch a modern rig to CW, your signal is also shifted about 800 Hz off frequency.

I don't use a computer. Does this mean I can't work HSCW?

No! HSMS was popular among Europeans for many years before computers were in any of their ham shacks. For receiving, an inexpensive audio cassette tape recorder can be modified to record the CW at a high speed and play it back at a slower speed. The basic technique is to add a new motor speed control. The motor is then run as fast as possible while recording, then slowed down to play back the HSCW at slow speed. Using this method, you should be able to receive 1200 LPM, and some machines will work up to 2000 LPM. The CMOS Super Keyer 3 (QST, August 1995) works well for transmitting. Not having a computer is no reason to give up the idea of working HSMS!

Sounds fascinating, but I really don't know that much about meteor scatter itself.

Meteor scatter operation is unlike any other type of operation!

If you are not familiar with it, you will have problems understanding what is being done on either SSB or HSCW MS. There are two articles that will help you understand meteor scatter. The primary article is "VHF Propagation by Meteor-Trail Ionization," by Walt Bain, W4LTU, published in the May 1974 QST, page 41. The second article is "VHF Meteor Scatter—An Astronomical Perspective," by Michael Owen, W9IP, published in the June 1986 QST, page 14. If you don't have access to QSTs going that far back, these two articles (plus many others on MS and most other types of VHF propagation) have been collected and reprinted in *Beyond Line of Sight*, edited by Emil Pocock, W3EP, and published by the ARRL. ARRL publications are available from your local ARRL dealer or directly from the ARRL. Mail orders to Publication Sales Dept, ARRL, 225 Main St, Newington, CT 06111-1494. You can call toll-free at tel 888-277-5289; fax your order to 860-594-0303; or send e-mail to pubsales@arri.org. Check out the full ARRL publications line on the World Wide Web at <http://www.arri.org/catalog>.

Is all HSCW meteor scatter on 2 meters only?

Most HSCW meteor scatter is done on 2 meters at the moment. A number of stations are setting up for HSCW operation on 50, 222 and 432 MHz. There is no reason why we cannot enjoy HSCW on all four of these bands. In fact, 6 meters would be a particularly good band for small, lower-powered stations (100 W or less) using omnidirectional antennas.

Does the Internet play a large role in modern HSCW operating?

Nearly all skeds are made using the Internet (via the HSCW Reflector, the "Hot Rocks" Web page, and several similar methods). The "Hot Rocks" page (and others in that series) has become very popular for making skeds in real time.

How many hams are currently active on HSCW in North America?

That's impossible to say because the list of active stations is growing rapidly. It started in North America with only two stations in June 1997, and has been growing at the rate of about two new stations each week since then. The most current list is found in the North American HSMS Directory on the Web at <http://www.qsl.net/n1bug/operate/hmsdb.html>. By the way, when you become active on HSCW, go to the Directory site and add your station to the list!

What showers are good for running HSCW?

Showers? The Europeans have a saying, "We make our own showers!" They mean that there are so many on HSCW in Europe, and it is so effective in utilizing only the few random pings from sporadics, that they do more during non-shower periods than we usually do during major showers! Of course, having the extra meteors of a shower certainly helps. Not just the few "major" or most popular showers, but even the minor showers can be plenty of an enhancement for HSCW.

Why aren't the other digital modes used this way?

Good question. There would appear to be several reasons. Packet, as usually used on VHF, is a strong-signal mode. Even during the peaks of the biggest showers, it is next to impossible to complete a QSO using it (though it has been done a few times). Some of the more "robust" digital modes used on HF would appear to have a much better chance. But remember that with HSCW, you are dealing with only a few fractional-second pings near the noise level, during non-shower periods, any day of the year. As the late W1FZJ always said, "The best filter is the one between the ears." The human brain can take the place of whole racks of multi-megabuck equipment. HSCW allows the operator, with a little help from his computer, to make VHF DX contacts at times when nothing else can do it.

This may sound dumb, but could these HSCW programs help with an SSB meteor scatter sked?

Another good question! Many times it's difficult to be sure just what information was actually heard on a weak SSB ping. If you're alert enough to save it into a buffer of MS DSP, you then can immediately replay it (at normal speed, of course) to be sure of what you heard.

to contact each other at a specific time and frequency using meteor-scatter propagation. The contact is built around alternate transmit and receive periods with certain information passed back and forth as the QSO develops. For SSB and normal CW skeds, the transmit/receive periods are 15 seconds long. For the HSCW sked, the periods are one minute each. During the one minute transmit period the operator is reviewing the previous period's received data. If you're really coordinated, you can decode a burst while continuing to record the remainder of the receive period, then change your transmit information based on what you have received, thereby reducing the time to complete the QSO!

As the hour approached for the first schedule I became nervous. I opened up multiple copies of *CoolEdit 96* and loaded all the possible files I might need to transmit. I made sure the computer's clock was calibrated to WWV. I even made a test transmission to be sure all cables and settings were correct.

Standard North American MS procedures dictated that I transmit first. When the time came, I flipped the switch and began transmitting. The next one-minute period would be Shelby's turn to transmit and my turn to receive. When I flipped the switch to receive I instantly heard a long loud burst with the unmistakable sound of an HSCW signal. I was so shocked to hear his signal on the first receive period that I just about forgot everything I had been practicing to do! Using my software, I slowed down the audio and confirmed that it was Shelby's signal. My heart was pounding like a triphammer!

I transmitted my return burst of Morse, but something seemed wrong. After several more minutes of confusion, I discovered that I was transmitting the wrong data back to Shelby. By the time I figured out what I should do I was just about out of schedule time. Ultimately, it took about three skeds before I got all the procedures down and mastered the coordination to work through to a completion. Then I enjoyed working three HSCW stations in exactly three days—all new grids!

What I've Learned

Since that time I have learned a great deal. While I have worked well-equipped stations capable even of moonbounce, I have also worked many smaller stations (like my own) running modest power and antennas. Suffice it to say, if your station is capable of working VHF troposcatter or regular SSB meteor scatter, you can run HSCW.

I need to point out, though, that monitoring for on-the-air signals is not easy. The HSCW calling frequency is 144.100 MHz, ± 2 kHz. Activity levels in the US are still low; and with HSCW operators spread over the continent, they typically use schedules. Waiting to randomly catch a burst may be harder than working an actual sked. On weekends and early morning hours during the week, you can follow the activity on the

HSCW Meteor Scatter Records are Made to be Broken!

In the accompanying photograph, Valerie Brady, WD8KVD, sits at the controls of the station of Shelby Ennis, W8WN, where she recently set a new HSCW record. Visiting during the Christmas holidays, Val was invited to take over as the operator during the daily 15-minute HSCW sked conducted each morning between her dad, Shelby Ennis, W8WN, and Steve Harrison, KO0U/1. Valerie had never been interested in CW, although she had passed the 13-WPM test for her General license nearly 20 years ago. After practicing for only 15 minutes with the popular HSCW program *MS DSP*, she found that not only could she handle the program, but she could copy the typical short meteor-scatter-type sequences at 15-20 WPM.

Challenged to become the first YL in North America to make a HSCW QSO, she completed not one, but two successful schedules with Steve Harrison, KO0U/1, in as many days. Both skeds were run at a slightly faster-than-normal speed of 5000 LPM (1000 WPM). Val and Steve then decided to go for the world record! Shelby and Steve held the previous record, set at a speed of 8500 LPM. Val removed all spaces from her transmit sequences that would yield a speed of about 8600 LPM (1720 WPM)!

The morning of the sked found good conditions with numerous "pings," but the increase in speed also reduced the S/N ratio making for difficult copy. In spite of this the world record sked lasted a mere 17 minutes with a final "73" and "TNX VAL CUL" message from KO0U/1. Asked how it was that she handled the CW so easily, she said, "What did you expect? I'm a girl! Of course it was easy!"

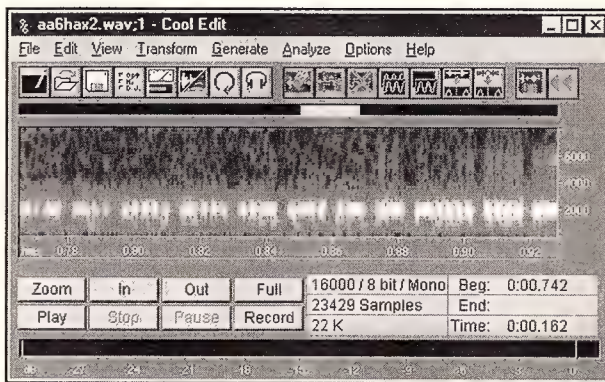


Figure 5—*CoolEdit 96* displays a received burst from a sked between KD5BUR and AA6HA. This portion of the burst is 170 ms long and shows the signal increasing in strength. The first action with a *CoolEdit 96* recording is to "paint" the approximate area of the window where the ping or burst is located. Then by using the **ZOOM** and **IN/OUT** buttons, the time scale is expanded to find the code characters.

MS ROCKS Web site where operators sometimes line up schedules in real time.¹⁰ You may also find announcements when an operator plans to call CQ. If you are located the right distance and direction from a station calling CQ or working a sked, you should be able to monitor the exchange. At this time, most schedules are made by e-mail. As activity increases, random contacts will become more common as is now the case in Europe.

Another thing that I found was that practicing the mechanics of a schedule was helpful—but nothing compares to running actual skeds. The more the better! The basic

one-minute protocol is essentially the same as for any other MS operation, but required data for a complete QSO must be understood as well as the procedures in regard to frequency settings. My best advice to you is that if you are in doubt about how to do something, simply ask your sked partner.

An excellent way to get acquainted with the sound and "feel" of HSCW is to download "ping practice" WAV files from the several Internet sites offering them.¹¹ These files can be played at full speed by any wave file player; but to copy the code contained in the ping, you will need one of the programs mentioned above. See Figure 5 for a *CoolEdit 96*

display of the burst recorded during a sked between AA6HA and KD5BUR. Can you see the characters?

Conclusion

What is the average HSCW experience like? The likelihood of completing a schedule varies from very low to very high. If it is estimated that you have a 10% chance of completing a given SSB meteor-scatter sked, you probably have a 90% chance of completing one with HSCW. I work some stations on the very first try while others have required several skeds. Unless attempting an extreme-distance contact, I almost always copy some amount of HSCW data. Ilkka Yrjola, OH5IY, reveals the challenge of meteor scatter in general with his table of "25 things that have an effect on MS reflections." He wrote, "Only a few of these are constants. A couple of the parameters are

known at $\pm 20\%$ accuracy, a couple of them vary a lot and one (or many) that cannot be pre-determined at all." Knowing the odds against a signal reflection reaching my sked partner's antenna from a grain of sand burning up at just the right spot in the sky makes me marvel at the high degree of success we enjoy!

By now I hope that you are ready to learn more and eventually become active on HSCW. Check out the Web sites listed for more information (and follow their links to some of the other fine VHF DX Web sites). If you live within 1000 miles or so of grid square EM23, I hope you will schedule a contact with me. I also work SSB MS skeds and would be glad to confirm this grid for you!

High speed CW is fun. It requires a dose of patience, a little bit of study and practice, and sharp operating skills—all the things I think hamming is about. Best of luck, and may you have "good reflections!"

Notes

- ¹Joe Mutter, PA0JMV, in a letter to Shelby Ennis, Sept. 4, 1997, <http://www.nitehawk.com/rasmit/hsms70.html>.
- ²Ed Tilton, W1HDQ, "The Earliest Efforts on 144 MHz Meteor Scatter," *QST*, October 1954, and Ken Willis, G8VR, "Meteor Scatter—European Style," *QST*, November 1986.
- ³John, PE1OGF, in a letter to Shelby Ennis, Sept. 4, 1997, <http://www.nitehawk.com/rasmit/hsms71.html>.
- ⁴N1BUG Circuits for HSCW, <http://www.qsl.net/n1bug/tech/hsms-cir.html>
- ⁵MSSOFT software, <http://www.sci.fi/~oh5iy/>.
- ⁶<http://www.qsl.net/n7stu/hscw.html>
- ⁷9A4GL homepage, <http://www.qsl.net/9a4gl/>
- ⁸<http://www.ilk.de/sites/gap/msound.htm>
- ⁹Syntrillium homepage, <http://www.syntrillium.com/10/cool.htm>
- ¹⁰MSROCKS Web page, <http://www.cybercomm.net/cgi-bin/cgiwrap/~slapshot/msrocks.sh>
- ¹¹KD5BUR HSCW page, <http://www.qsl.net/kd5bur/>

QST

New Books

VHF/UHF HANDBOOK

Edited by Dick Biddulph, G8DPS

Published by the Radio Society of Great Britain (RSGB). Soft cover, 10¹¹/₁₆ × 8³/₄, B&W illus and photos, 317 pages, ISBN 1 872309 429. Available from the ARRL, \$35 plus shipping. Order Item 6559. Also available directly from the RSGB and at selected retailers.

*Reviewed by Paul Danzer, N1II
ARRL Technical Advisor*

Imagine a radio amateur's handbook, devoted entirely to VHF and UHF. That's what is in this latest RSGB edition. The preceding edition was first published in 1969, and reprinted as recently as 1994. This new edition was published in 1997, and consists of 12 chapters and several appendices.

Unlike its predecessor, there is no microwave chapter. A separate series of RSGB books now cover microwaves. Each chapter was written by a different author or authors, making this book the work of 15 people, according to the listing at the front of the book.

This book contains material at all levels, from beginners to advanced experimenters. A very readable introduction includes several interesting stories, including a tale that ties the under-30 MHz Morse code requirement to the need of early commercial stations to tell amateurs to clear off a frequency—but only in code!

A second introductory chapter, *Getting Started*, is directed toward those who are interested in trying VHF/UHF operation for the first time. US readers take note: a good bit of this material is directed toward UK hams, their laws and requirements.

Not so in the succeeding chapter—*Propa-*

gation. Interested in the effect of weather and propagation on line-of-sight propagation? How about ducting, refractive indices, extracting meteorological data from broadcasts? Radiosonde ascent data and tepigrams? A total of 36 pages of propagation-related information, including several reference charts, is included.

The largest chapter, 85 pages, is devoted to receivers, transmitters and transceivers. As you might expect, the material is heavy on signal-to-noise considerations, tuned cavities, microstrip construction, and all the technologies that contribute to a modern VHF or UHF station. Both US and UK sources are used for this material and for the 88-item reference listing. PC board layouts are supplied at 1:1 size in an appendix.

The antenna and transmission lines chapter follows the hardware chapter, and provides a compact survey of what you might like to know for antennas in this frequency range. The illustrations are reasonably clear, and there are a few paragraphs on building your own helical whip (rubber ducky).

An EMC chapter contains some material of interest to the US ham, but several of the sections are directed, as you might expect, to commercial filters and parts that match the various telephones and appliances found in the UK. The various standards and specifications discussed will be unfamiliar to most US hams, although the problems and the general cures are very applicable, independent of your location.

Brief chapters cover data modes, ATV and repeaters. The CTCSS tone encode chart is interesting, and makes you wonder just how so many repeaters can work in a relatively small area.

The test equipment chapter is really for

home-brewers. Bridges, dummy loads, RF voltmeters, attenuators—all are shown with clear illustrations to help you build your next test instrument. Even a VHF FET dip oscillator is included. The parts designations will not be found in US catalogs, but by reading the text you can pretty well guess what the requirements are for US component substitution.

If you are interested in UHF and VHF, especially with a view toward home-brewing, take a look at the *VHF/UHF Handbook*. You won't go wrong. **QST**

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A High-Performance, Single-Signal, Direct-Conversion Receiver with DSP Filtering

By adding a DSP demodulator to a well-established and popular receiver design—KK7B's R2—you can have a bit of the latest filter technology at your fingertips!



With so many new radios incorporating digital signal processing (DSP) for demodulation and filtering, I got the itch to play with one myself. By “play with one,” I don’t mean merely *operate* a DSP-equipped receiver, I wanted to be able to put *my own* software into the receiver and put to work some of those nifty signal-processing ideas I teach others how to use!

Why DSP?

You may wonder “What’s the big deal?” Why are so many of the new radios supplied with DSP demodulators and filters? It’s because digital techniques have several advantages over their analog counterparts. Probably the most exciting aspect of this is that everything is done in *software*. This means that when I design a new demodulator, *you* can download it to *your* radio and *you* then have my new demodulator! No soldering; no hunting for parts; no ugly modifications—it’s *so* easy! Another benefit is that the results are predictable. Component tolerances are *not* a factor as they are with analog signal processing. Simulations are easier to do, and their results more closely approximate what happens in a real system. Another advantage results from the speed of today’s digital signal processors. Nowadays, it is quite

realistic to have a digital filter with the equivalent of *hundreds* of poles. (In the analog domain, it takes one inductor or capacitor to make one pole.) Few analog designers use more than *ten* poles in a filter, because it’s very difficult to make an analog filter with more than about *ten* poles work properly.

Some Background

This project started in 1994. Ralph Stirling, KC3F, and I did exactly what Rick Campbell, KK7B, suggested in his R2 receiver article.¹ (Get your copy of that article and have it handy!) We used Rick’s R2 receiver and a Texas Instruments C5X DSK DSP starter kit to construct a DSP-based direct conversion (D-C) receiver. We modified the DSP kit with our custom daughterboard containing another TLC32040 codec. The DSP board replaced the analog phase-shift network with its own digital counterpart and a sharp digital filter. With this setup, we were able to obtain an opposite-sideband rejection of almost 50 dB. However, the receiver wasn’t quite ready to take home and tune to 20 meters—the gain distribution needed adjustment.

About this time, Motorola unveiled the DSP56002EVM evaluation board.² It made obsolete our work with the TI board. The Crystal Semiconductor 16 bit stereo codec on the Motorola board is much better than the two TI 12 bit TLC32040 codecs. The

Motorola 56002 processor uses 24 bits of precision; the TI TMS320C5X uses only 16. It was obvious that we needed to start over.

That start didn’t come until I taught a communication systems course during the winter quarter of 1996. As a homework assignment, I had my students try the Motorola EVM (evaluation module) in place of the TI DSK. It proved simple to modify a filter program supplied by Motorola to do the basic filtering necessary for SSB demodulation, and it worked much better than the TI DSK-based receiver. I spent many hours during the summer improving on that design. This article describes that improved system.

Implementation

We chose KK7B’s R2 receiver not only because of its high dynamic range and ready availability, but for the image-reject downconverter it uses. Its in-phase (I) and quadrature (Q) channels provide the signals needed to demodulate *any* form of modulation resulting in a band-pass signal.³ These are called the *in-phase modulation*, $x(t)$ and the *quadrature modulation*, $y(t)$ signals. (See Figure 1.) The demodulators described here are for AM, DSB, CW, SSB and ISB, but because accommodating other modes needs only new software, we can expect more modes to be available in the future.

¹Notes appear on page 45.

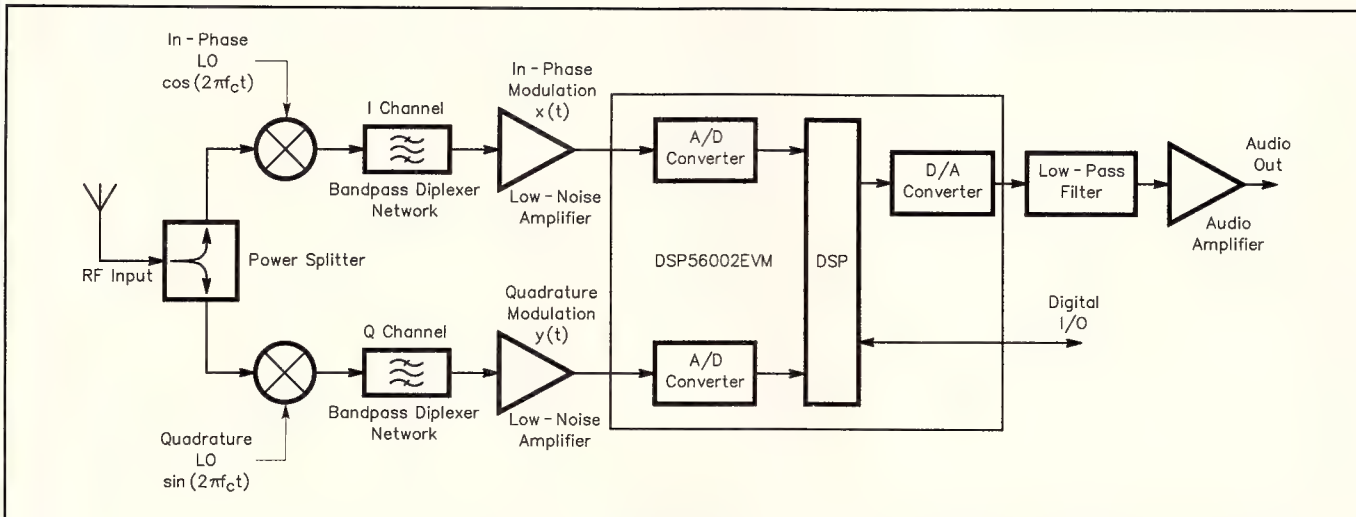


Figure 1—A block diagram of the receiver showing how the DSP56002EVM fits into the R2 receiver signal path. The signals $x(t)$ and $y(t)$ are all that are necessary for demodulating *any* signal in the passband. The DSP software presently demodulates SSB, CW, AM and ISB, but all that is necessary to accommodate any other mode is new software. There are only three hardware connection points needed. It's so easy, you've got to try it!

The R2 receiver also provides a very good match for the Motorola DSP EVM. To duplicate this project, all you need to do is connect the analog I/O connectors of the DSP board to three places on the R2 receiver board. It is a delight to be able to put this project together without any ugly dead-bug wiring or extra analog circuit design! More on that under Hardware.

Project cost is modest. The R2 kit is available for about \$109 from Kanga; the circuit board alone is available for \$20.⁴ With group orders, I've seen the Motorola

DSP board price as low as \$85; standard price is about \$150.⁵ The addition of an NVROM (discussed later under Boot ROM,) adds a few dollars to the total cost.

The steep skirts of the digital filters are advantageous on SSB and CW. Simulated and measured filter responses for those modes are shown in Figures 2A and B. The simulation does not include quantization effects of the analog-to-digital converter (ADC) or the processor. The filter shape factors are all less than 1.3:1.

Opposite-sideband rejection is at least as

good with the DSP demodulator (we measured it at almost 50 dB) as it is with the original analog demodulator. Figure 3 shows a simulation of the opposite-sideband rejection for SSB and CW. The simulation assumes that all the analog electronics are perfect and that there is no quantization error. With these assumptions, the sideband rejection is much greater than the 50 dB we measured. It is very important that the I and Q channel components be matched carefully and that the local oscillator (LO) provides equal amplitude signals, 90° out of phase.

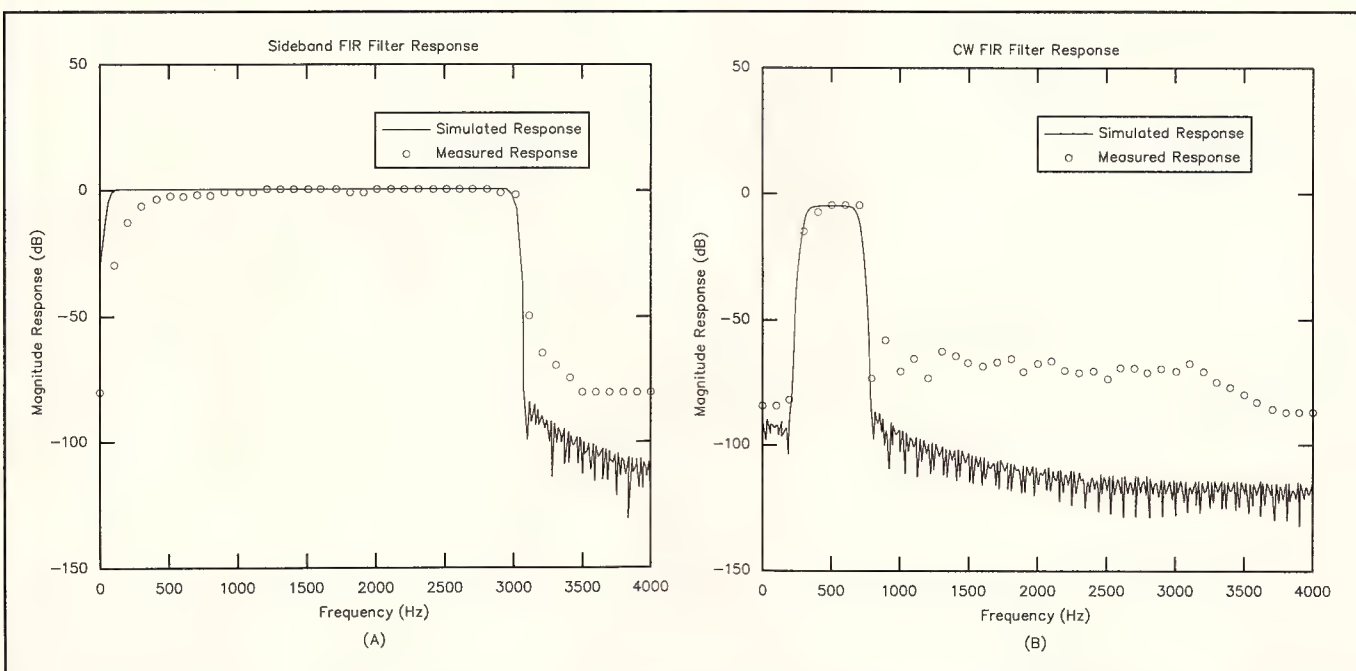


Figure 2—At A, simulated and measured frequency response for SSB. Note the steep skirts. The filter shape factor is 1.1:1. It would be even better, but the dominant low-frequency response is from the analog diplexer. The FIR design cutoff frequencies for this filter are 60 Hz and 3 kHz. The CW filter response curves (B) show a shape factor of less than 1.3:1. This is much better than the 2.1:1 shape factor of the analog demodulator. The FIR design cutoff frequencies are 300 Hz and 700 Hz.

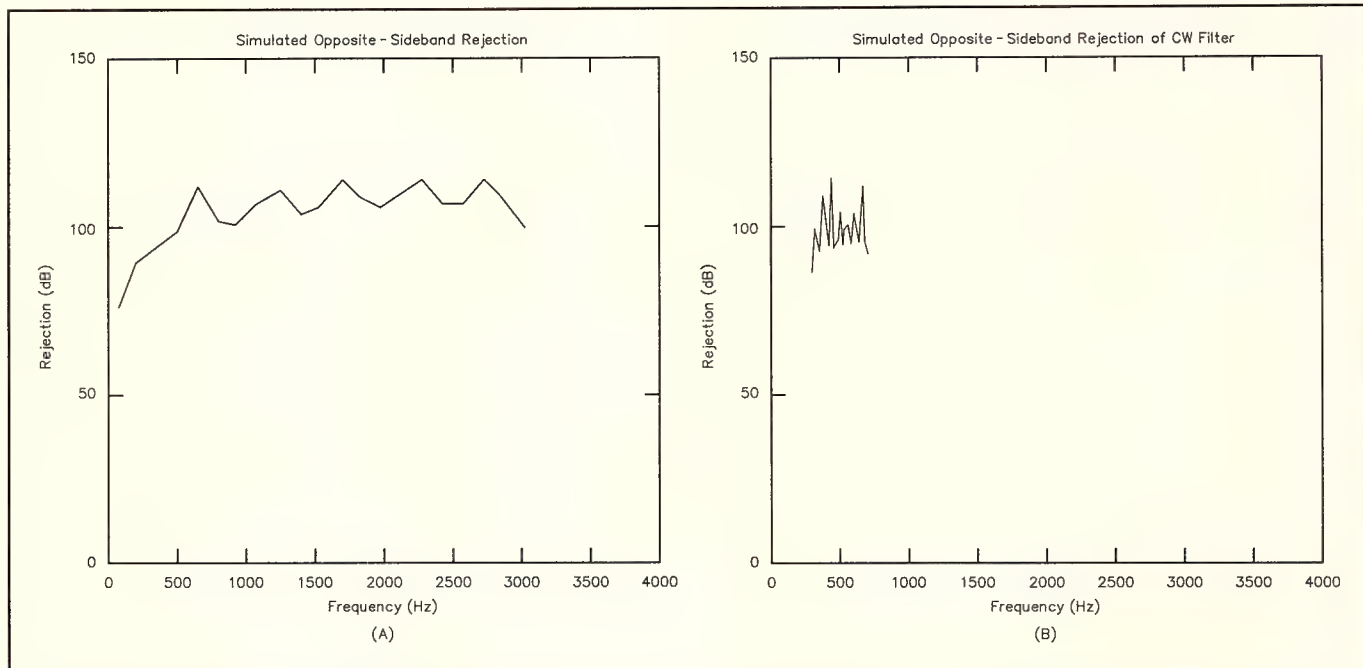


Figure 3—SSB opposite-sideband rejection (A) is limited only by the FIR filter's finite length. This filter's response is good enough to blame the opposite-sideband leakage on the analog components preceding the FIR filter. At B, simulated opposite-sideband rejection of the CW filter, assuming everything is perfect except the FIR filter. Quantization effects are also neglected. The FIR filter is not the cause of much opposite-sideband leakage. This, however, is not the case for all FIR filters tried.

There is a possible 0.5 dB gain mismatch between channels of the codec. I made no effort to measure and eliminate this, but it would be easy to do. The advantage of the DSP demodulator is that there are fewer components that must be matched. It might be worth the time and effort to match those more carefully.

Because of the analog filtering before the DSP stage, I expected the IMD dynamic range to be the same with digital demodulation as it is with analog demodulation. Measurement bears this out. On the other hand, the blocking dynamic range turns out to be about 13 dB poorer with the digital demodulator than with its analog counterpart. It is still quite respectable, however, at 113 dB. Perhaps it is reasonable to keep both demodulators, switching between them as necessary, especially because the analog demodulator is already on the R2 board.

Hardware

Connecting the DSP demodulator to the R2 receiver is simple. Other than the R2 board, the Motorola DSP EVM, some shielded wire, a few connectors, and, optionally, a switch or two and enclosures, no other hardware is needed. It is *very easy*!

EVM and R2 Interconnections

The Motorola EVM codec has a wide range of adjustability for input and output signal levels. This is quite important. It makes it possible to connect to the R2 receiver in just the places that Rick suggested

without adding any gain or attenuation. The EVM uses miniature stereo connectors for audio input and output. The current software uses one output channel for LSB and the other for USB. This allows us to demodulate independent sideband (ISB). Beyond this stage, only *one* sideband is amplified.

Basically, the R2's audio phase-shift networks are replaced by the DSP board. Refer to the R2 information I told you to have on hand for the following steps: On the R2 board, disconnect the wire from C10 to R20 and C21, and reconnect it to the left audio-input channel of the DSP board. Similarly, disconnect C20 from R35 and C26, and reconnect it to the right audio-input channel of the DSP board. These two connections send the in-phase modulation, $x(t)$, and the quadrature modulation, $y(t)$, to the two analog input channels of the DSP EVM. (See Figure 1.)

The analog output must be connected to the R2's audio amplifier. To do this, disconnect the wire from the output of U5A to C25. Depending on which sideband you want to demodulate, connect the wire leading to C25 to the right or left audio output of the DSP board. All other connections remain as they were for the R2 with the original analog demodulator. I suggest placing the DSP EVM and the R2 board in separate enclosures and using shielded cable for all interconnections.

Boot ROM

One step I took to make the receiver run

stand-alone (without having to use a PC to load the software every time you turn it on) was to insert an ATMEL AT29C256 non-volatile, read-only memory (NVRAM)⁶ into a socket soldered in the area marked **U10** on the evaluation board. (It was thoughtful of Motorola to provide this luxury for us.) This NVRAM can be programmed on-board using free software available on the Internet or a preprogrammed IC can be purchased from Kanga.^{7,8} The NVRAM is an accessory well worth the small additional investment.

Software Description

The software demodulates AM, DSB, CW, SSB and ISB. I picked SSB and CW because they are my favorite HF modes. I like to have an AM demodulator to use when listening to WWV and shortwave broadcast stations. DSB can be demodulated with the AM detector, so it is a freebie. I implemented ISB because it was so easy to do, and having it made changing sidebands easier. ISB doesn't seem to be used much on the ham bands, but it could be used for simultaneously transmitting an SSTV picture on LSB while explaining it on USB voice. These modes don't exploit all the advantages of a DSP demodulator, but they certainly illustrate it. This receiver is just *crying* for some software for the digital modes! Can't you hear it?

Sampling Rate

I tried several different sampling rates between 8 kHz and 48 kHz. Sampling

theory advises us to use a rate at least twice as fast as the highest frequency component in the signal we are processing. Faster sampling rates actually cut the quantization noise a small amount, but they leave less

time for processing the signal between samples. I finally settled on an 8 kHz rate because the filters I used to get good opposite-sideband rejection required more processing time. With the Motorola EVM, you

can set the processor clock speed to 80 MHz via software. (Motorola claims some of their EVMs will operate at that speed.) I decided I would rather have the software work with *all* the EVMs, so I didn't try 80 MHz. Yet another possibility is to use the new Motorola DSP56303EVM. Its processor is twice as fast as the 56002, and it uses the same codec.

Designing Custom Frequency Responses for FIR Filters

Designing your custom frequency response into a FIR filter is really quite easy. All you need to modify are the FIR filter coefficients. Presented here are only the formulas to tailor the cut-off frequencies to your liking. If you are familiar with calculus, investigate the references.^{††}

Three steps are involved in calculating the filter coefficients. The first is to find the unwindowed I and Q filter coefficients:

$$h_I(m) = \frac{1}{\pi m} \left[\sin\left(\frac{2\pi m f_H}{f_s}\right) - \sin\left(\frac{2\pi m f_L}{f_s}\right) \right] \quad (\text{Eq 1})$$

and

$$h_Q(m) = \frac{1}{\pi m} \left[\cos\left(\frac{2\pi m f_H}{f_s}\right) - \cos\left(\frac{2\pi m f_L}{f_s}\right) \right] \quad (\text{Eq 2})$$

$$m \in \left\{ -\frac{M}{2}, \dots, \frac{M}{2} - 1 \right\} \quad (\text{Eq 3})$$

The desired lower cutoff frequency is f_L , and the upper one is f_H ; f_s is the sampling rate (8 kHz in this case). M is the number of filter coefficients you use. The software presently uses 256 coefficients for each channel. This is the reason M goes from -128 to 127. Note the similarity between the I and Q coefficients. The only change between them is the sine terms becoming cosine terms. This provides the 90 degrees of phase delay necessary. If you are modifying the response curve for AM or DSB, set $h_Q(m) = 0$.

The next step is to apply the windowing function. The purpose of the windowing function is to reduce the sidelobes (bumps in the filter response caused by Gibbs' phenomenon). The Kaiser window I used is a semioptimum windowing function that allows trading sidelobe levels for sharpness of the transition region, by varying the parameter, β . I used a $\beta=8.0$. Other windowing functions are possible.[‡] To apply the windowing function, multiply each coefficient by its window value, given by:

$$w(m) = \frac{I_0\left[\beta \sqrt{1 - \left(\frac{2m}{M}\right)^2}\right]}{I_0(\beta)} \quad (\text{Eq 4})$$

where $I_0(\cdot)$ is the zeroth-order modified Bessel Function of the first kind.

The final step is to plot the response curve actually obtained (neglecting, of course, quantization and finite wordlength effects). If you like the response, great. If not, go back to step one. Remember: The dynamic range of the codec limits the stopband attenuation to about 80 dB. The equation for computing this frequency response is:

$$|H(f)| \approx \sum_{m=1}^{\frac{M}{2}} 2h(m) \sin\left(\frac{2\pi m f}{f_s}\right) \quad (\text{Eq 5})$$

It is exact for an odd number of coefficients, M , and very close for an even number of M . (All these steps are automated if you have access to *MATLAB*. The *MATLAB* code uses an exact relation for any number of M , even or odd.) *MATLAB* will also plot the theoretical opposite sideband rejection if everything except the FIR filter is perfect. The software that does this is available at my Web site: <http://www.wwc.edu/~frohn/R2-DSP.html>.—Rob Frohne, KL7NA

*John Ash, KB7ONG, Fred Christensen, KA6PNW, and Rob Frohne, KL7NA, "DSP Voice Frequency Compander for use in RF Communications," *QEX*, Jul 1994, pp 5-10.

†Rob Frohne, KL7NA, "A Practical Note on Designing FIR Filters," *Feedback*, *QEX*, Oct 1994, p 32.

‡John Wiseman, KE3QG, "A Complete DSP Design Example Using FIR Filters," *QEX*, Jul 1996, pp 3-15.

**Alan V. Oppenheim and Ronald W. Schaffer, *Discrete-Time Signal Processing* (Englewood Cliffs, Prentice-Hall, 1989).

AGC

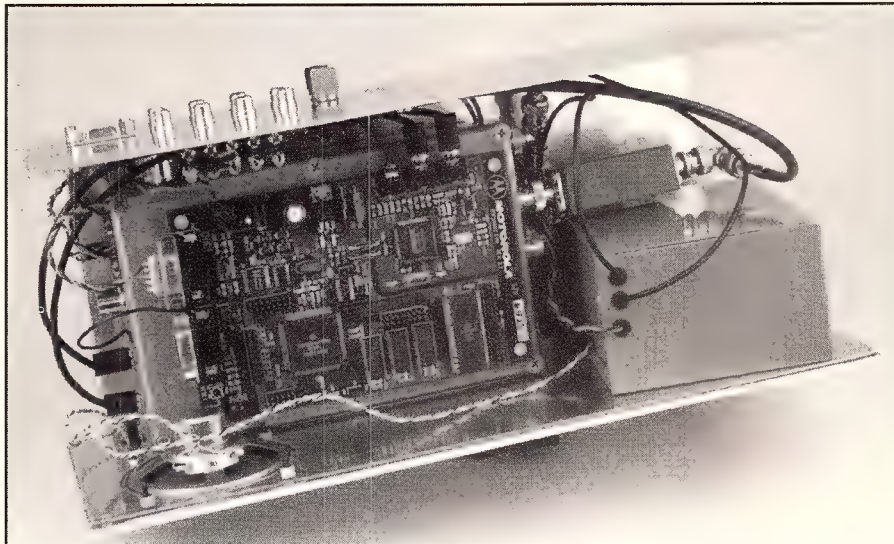
In all modes, the software incorporates 22.5 dB of AGC. The AGC is different than that of most receivers. You will *not* find it useful in keeping your eardrums in one piece. Its purpose is to keep the signals to the ADC in range as long as possible. The dynamic range of the ADC is greater than 80 dB.⁹ Because of the narrow filters preceding the ADC, I noticed no AGC pumping from a signal 20 kHz off frequency, until it was -10 dBm (more than 60 dB over S9). At that level, an oscillation at about 1 Hz ensues.

Designing and debugging the AGC turned out to be one of the most challenging parts of this project. The codec has provisions to let the DSP know when an overload has occurred. It also provides a way of adjusting the gain (on the fly) by up to 22.5 dB in 1.5 dB increments. The gain is changed only when the signal passes through zero. This helps eliminate "zipper noise" created by sudden gain changes when the signal is at a high level. The AGC software checks for an overload condition. When it finds one, it lowers the gain. Then it doesn't check again until the codec has had time to clear the overload condition and change the gain.¹⁰ The AGC has a fast attack of about 0.75 dB/ms, and a slow decay of about 6 dB/s. There is a noticeable—but unobjectionable—cycling effect when AGC is active because of the discrete gain steps of 1.5 dB. This effect occurs, of course, only on the very loudest signals (above about -50 dBm, or more than 20 dB over S9) and is noticeable only on constant-level carriers.

Demodulation

The generalized demodulation scheme follows that shown in Figure 1. I chose this scheme because it retains all the information present in the modulation in the signals $x(t)$ and $y(t)$. With only software changes, we can demodulate any form of modulation. Actually, limitations in the speed of—or memory available to—the DSP, or the large bandwidth of the modulated signal may prevent this, but I don't foresee that happening often.

SSB, ISB, AM, DSB and CW can all be demodulated in DSP using only linear operations. Two channels of finite impulse response (FIR) filtering are employed for this. These are the I and the Q channel filters (see Figure 4 and 5). FIR filters were chosen because of their simplicity. Any band-limited linear operation can be approximated by selecting the proper FIR fil-



An inside view of the receiver. The Motorola DSP EVM sits atop an aluminum enclosure that contains the R2 components. The gray box to the right houses the LO. The small box nearby is the 40-meter band-pass filter that sits between the antenna input and the input to the R2.

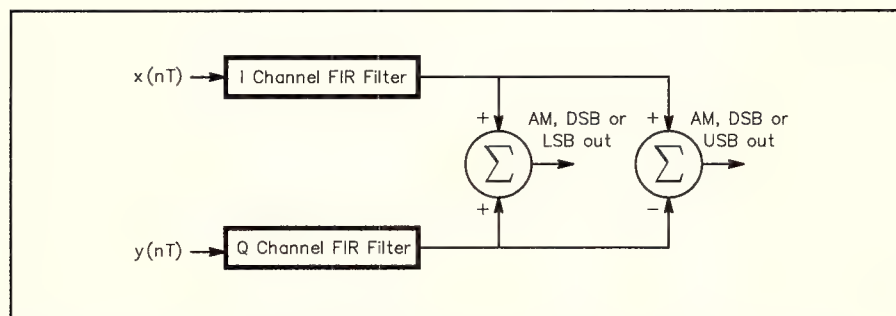


Figure 4—Block diagram of the program used for all modes: SSB, CW, AM, DSB and ISB. The signals $x(nT)$ and $y(nT)$ represent the sampled in-phase and quadrature modulations, respectively. With the SSB, CW, ISB demodulator, the I and Q channels have identical gain characteristics, but the Q channel's phase lags the I channel's by 90° . The outputs for USB and LSB (or one of the outputs for AM and DSB) are sent to the two output channels of the stereo codec.

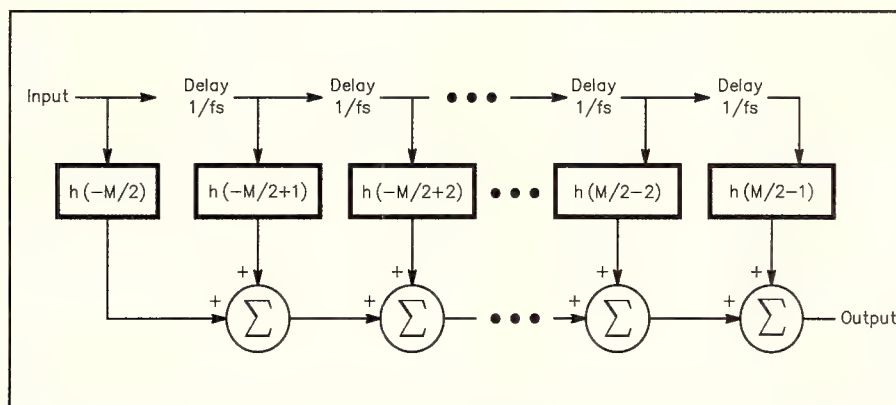


Figure 5—FIR filter represented as a tapped delay line. There are M filter coefficients, $h(\bullet)$, and the delays are each $1/f_s$ second, which is the time between samples.

ter coefficients, $h(M)$. The more coefficients used, the better the approximation. A FIR filter is really just a tapped delay line. The coefficients are the weights of each of the delayed signals that are summed at the output. This makes programming particularly easy; there is only one program, but there are eight sets of coefficients, two for each demodulation type. To design your own custom frequency response, you need not understand the details of the program—you need only understand the basics of FIR filter design. (If this interests you, see the sidebar "Designing Custom Frequency Responses for FIR Filters" and John [KE3QG] Wiseman's article¹¹ for designing your own custom filter responses.) After $x(t)$ and $y(t)$ are filtered, their sum yields the one sideband, and their difference yields the other sideband. Each sideband is sent to a channel of D/A on the stereo codec.

*MATLAB*¹² is a very useful tool for computing filter coefficients, plotting the corresponding frequency-response curves and computing the opposite-sideband rejection of the whole receiver, assuming everything is perfect except the FIR filters. The only things I didn't simulate in *MATLAB* were the effects of quantization of the ADCs and DACs, the finite word length of the DSP and the imperfections in the analog circuitry. I was grateful that most of the design could be so easily simulated. It shortened the testing and debugging phase of the project by many, many hours.

AM and DSB Demodulation

The same product detector is used for AM and DSB demodulation. A product detector ac-coupled to the output demodulates either AM or DSB modulation. Using a product detector has the advantage of having a heterodyne for zero beat. I find this particularly handy to tune in the signal exactly.

The I channel is simply passed straight through. The Q channel is unused. Actually, its gain is set at zero so it won't affect anything when the outputs of the two channels are summed. See Figure 4. To accomplish this, the I filter coefficients are set to $\{1, 0, 0, 0, \dots\}$, and those of the Q filter to $\{0, 0, 0, 0, \dots\}$. These coefficients let the R2's analog filters and the DSP's antialias filter do all the filtering for AM and DSB demodulation. The narrow, analog, elliptical, filter bandwidth of my R2 board is fine for listening to shortwave broadcast stations. In the future, however, I intend to try a Butterworth design having a wider bandwidth. With that, a faster sampling rate and the right coefficients, the DSP could tailor the frequency response

CW, ISB and SSB

For CW, ISB and SSB, the I and Q channel filters have identical-magnitude responses; the phase of the Q channel's filter

Table 1
Receiver Performance Specifications, SSB

SSB Receiver	R2 with DSP Demodulator	R2 with Analog Demodulator
Minimum Discernible Signal	-116 dBm	-116 dBm
Blocking Dynamic Range	113 dB	126 dB
IMD Dynamic Range	89 dB	90 dB
Shape Factor	1.1:1	1.6:1
Opposite Sideband Rejection	40 to 50 dB	40 to 50 dB

response is delayed by 90° with respect to the I channel. See Figure 4. The band-pass filter widths are those appropriate for the different modes (3 kHz for SSB and 400 Hz for CW). This scheme yields single-signal reception.¹³

The filter responses are created by defining the passband desired and computing the coefficients from that data. Finally, the coefficients are tapered at the ends by multiplying them by a windowing function. The windowing function sacrifices steep skirts for a more-uniform, high attenuation in the stop-band. If the windowing function is omitted, stop-band sidelobes from the Gibbs phenomenon¹⁴ are relatively large. After trying several windowing functions, I finally settled on a Kaiser window.¹⁵ It has an adjustable parameter, β , to control the trade-off between a steep transition region and lower sidelobe levels. You can use the formulas given in the FIR filter design sidebar to compute your own filter coefficients and plot the resulting frequency-response curves. All the software, including the *MATLAB* code, is available free on the Internet and from the ARRL BBS.¹⁶

Test Results

Table 1 provides a summary of the measured parameters compared to those of the original analog demodulator. SSB was used for all the measurements (see Table 1). I used several old HP-606A signal generators for the LO and test signals because they are virtually free of phase noise. I measured the dynamic range—both two-tone IMD and blocking—at 20 kHz spacing. To measure the output, I used a Fluke 8910A true RMS voltmeter. The power splitter used for the dynamic range tests is a Mini-Circuits PSC2-1. The LO phase-shift network I used is a one-pole crossover network.¹⁷

Table 1 shows some of the trade-offs between the analog and DSP demodulators. The DSP wins on shape factor, but loses on blocking dynamic range. Don't forget, however, to factor in the *versatility* of the DSP. The real advantages of the DSP demodulator won't be seen until someone starts using this setup to design custom demodulators for some of the fancier digital modes.

Summary

I've enjoyed listening to Europe, South America and the Pacific from my office using this receiver with only a UHF discone on the roof.

Download my software! Play with it! I'm looking forward to the day when I'll hear you on 20 meters saying "Hey Rob! Why don't you download my latest demodulator!"

Acknowledgments

I want to thank Ralph Stirling, KC3F, who did the hardware portions of the first generation DSP demodulator with the TI DSK, my communication systems students for trying this out for me in their homework assignments and for reading the manuscript, and Jim Forsyth, WA7CLI, for constructing a respectable cabinet for the R2-DSP receiver.

Notes

¹Rick Campbell, KK7B, "High-Performance, Single-Signal Direct-Conversion Receivers," *QST*, Jan 1993, pp 32-40.

²Johan Forrer, KC7WW, "Using the Motorola DSP56002EVM for Amateur Radio DSP Projects," *QEX*, Aug 1995, pp 14-20.

³Leon W. Couch II, "Digital and Analog Communication Systems," 4th ed. (New York: Macmillan Publishing Company, 1993). A band-pass signal is one whose spectra is concentrated about a carrier frequency.

⁴Kanga US, Bill Kelsey, 3521 Spring Lake Dr, Findlay, OH 45840, tel 419-423-4604 e-mail kanga@bright.net and <http://qrp.cc.nd.edu/kanga/>.

⁵The DSP EVM can be purchased directly from Motorola and from any of several outlets such as Hamilton Hallmark, Newark, Arrow, Wiley, etc. Check your telephone book Yellow Pages or visit http://www.mot-sps.com/sales/sales_web.html.

⁶A list of Atmel product distributors can be found at <http://www.atmel.com/atmel/contents.html>.

⁷The free software is *FLASHBOOT.ASM*, by Chris Hanna and Helmut Strickner, and is available from the TAPR site at <ftp://ftp.tapr.org/tapr/SIG/hfsig/upload/flashboot.zip>.

⁸See Note 4.

⁹A data sheet for the Crystal Semiconductor CS4215, 16-bit multimedia audio codec, is available at <http://www.cirrus.com/products/overviews/cs4215.html>. Crystal Semiconductor Corporation is a division of

Cirrus Logic Inc, 3100 West Warren Ave, Fremont, CA 94538, tel 510-623-8300, fax 510-252-6020, <http://www.cirrus.com>.

¹⁰The codec uses a digital filter in its sigma delta ADC that has a pipeline of 16 data points, so we must wait until those have passed before we check for the overload condition.

¹¹John Wiseman, KE3QG, "A Complete DSP Design Example Using FIR Filters," *QEX*, Jul 1996, pp 3-13.

¹²*MATLAB*, The MathWorks Inc, Cochituate Pl, 24 Prime Park Way, Natick, MA 01760; <http://www.mathworks.com/products/>.

¹³Gary Breed, K9AY, "A New Breed of Receiver," *QST*, Jan 1988, pp 16-23.

¹⁴Jerry B. Marion, "Classical Dynamics of Particles and Systems," 2nd ed. (New York: Academic Press, 1970), p 133.

¹⁵Alan V. Oppenheim and Ronald W. Schaffer, "Discrete-Time Signal Processing," (Englewood Cliffs: Prentice-Hall, 1989), pp 452-462.

¹⁶This software is available at <http://www.wwc.edu/~frohro/R2-DSP.html> and from the ARRL by ftp from [oak.oakland.edu/pub/hamradio/arrl/qst-binaries](ftp://oak.oakland.edu/pub/hamradio/arrl/qst-binaries) and from the ARRL BBS 860-594-0306..

¹⁷Rick Campbell, KK7B, "High-Performance, Single-Signal, Direct-Conversion Receivers," *QST*, Jan 1993, p 37, Figure 6A, and Gary Breed, K9AY, "A New Breed of Receiver," *QST*, Jan 1988, pp 16-23.

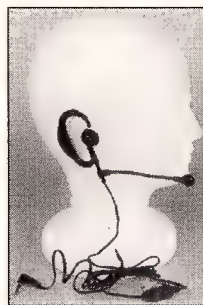
Rob Frohne, KL7NA, is a professor of electrical engineering at Walla Walla College. He holds a BSE from Walla Walla College and an MSEE and PhD from Purdue University. Rob was first licensed in the mid-'70s as a teenager and has previously held the call signs WL7IIP, KL7IIP and V63NA. He enjoys working DX, especially long-haul on 20 meters.

You can contact Rob at 214 W. Whitman Dr, College Pl, WA 99324, e-mail frohro@wwc.edu.

QST

New Products

MINI BOOM MIKE FOR HAND-HELDS



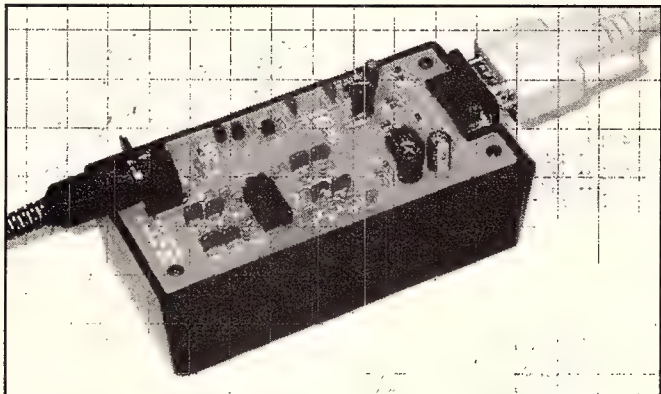
◇ SPM-400 series mini boom mikes, manufactured by Premier Communications, work with all popular Amateur Radio and commercial hand-held radios. The new SPM-400 features a comfortable, adjustable rubber ear hook and

a clip-on PTT switch for hands-free operation. Specs: Mike impedance, 1000 ohms; speaker impedance, 8 ohms.

Four models are available: SPM-400 (ADI, ICOM, Standard and old-style Yaesu); SPM-401 (Kenwood); SPM-402 (Yaesu FT-50 and VX-1R); and the SPM-403 (for Motorola Radius-compatible radios).

Prices: \$25.95 (400); \$27.95 (401); \$20.95 (402); \$29.95 (403). For more information, contact Premier Communications at 909-869-5711; <http://www.adi-radio.com>.

VolksRTTY—An Improved HamComm Interface



(Photo by the author)

Connected to your PC and HF transceiver, this easily constructed interface puts you on RTTY and AMTOR for less than \$40!

Like many amateurs, I have long been fascinated by the digital modes but, until recently, never got around to adding this capability to my station. That changed when, last year, one of my coworkers casually handed me a computer disk with the explanation that he had found a “way cool” RTTY program on the Internet and thought that I’d be interested in it. Having seen lots of genuinely bad shareware and freeware over the years, I was initially skeptical, but graciously thanked him and agreed to take the program home and try it.

After I scanned the documentation and played with the program, my skepticism grew. The software, *HamComm Version 3.1*, purported to send and receive CW, RTTY and AMTOR with no more of a hardware interface than a 741 op amp and a few resistors, capacitors and diodes. Still, *HamComm* has a superbly intuitive user interface and a number of terrific features such as a “spectral analyzer” display that allows fast, precise receiver tuning and macros that eliminate much of the drudgery of typing call sign and contest exchanges. Intrigued by *HamComm*’s potential, I breadboarded the interface shown in the accompanying documentation and was pleasantly surprised to find that it worked immediately upon power-up!

A few minutes of tuning around the

RTTY portion of 20 meters established that, under good conditions (medium to strong signals and minimal QRM and QRN), *HamComm* did a credible job of printing RTTY signals with the rudimentary interface. Receiver tuning was a snap—much easier and more accurate than what I had experienced with the tuning indicators on commercial TNCs. Finding a strong station calling CQ, I responded with a snappy 1×2 call and was rewarded with my first RTTY QSO in 35+ years of hamming! I was hooked!

After a few hours of operating with my new RTTY gear, however, it became apparent that even moderate amounts of QRM or QRN caused the “print quality” (readability) to deteriorate. Reasoning that the performance limitation lay more in the interface hardware than in the software, I set about developing an improved interface. The result of that endeavor is an easily constructed circuit that, in conjunction with *HamComm*, operates with any IBM-compatible PC—even vintage machines such as the XT or ’286. Power for the modem is derived from the PC’s serial (RS-232) port, so portable operation with a laptop is easily accomplished. Although performance falls a bit shy of a state-of-the-art DSP-based TNC, it is entirely suitable for serious DX, ragchewing and contest work. Given *HamComm*’s German

heritage, the interface’s simplicity, and its excellent cost/performance ratio, I have christened it *VolksRTTY*—an RTTY modem for everyone.¹

Circuit Description

See Figures 1 and 2. *VolksRTTY* is comprised of four functional elements: power supply, received-signal conditioner, FSK generator and TR switch. Let’s trace the signal flow through each stage before proceeding with the construction details.

Power Supply

Depending on their logical state, the active pins of the serial port assume a nominal -10 V or $+10\text{ V}$ level. Most IBM-compatible PCs can source about 5 mA from each of these pins before the voltage starts to sag. *VolksRTTY* derives its plus and minus operating voltages from the DTR and RTS pins using diodes D1 through D4 with smoothing provided by C11 and C12. During receive, DTR outputs $+10\text{ V}$ and RTS -10 V . During transmit, DTR outputs an asymmetrical square wave corresponding to the mark/space state, while RTS goes high to turn on the TR switch. To provide operating voltages in either mode, the four diodes are cross-connected as a bridge rec-

¹Notes appear on page 50.

tifier. This simple configuration provides plus and minus rail voltages of 7 to 10 V under load, a range that is compatible with standard RS-232 levels.

RX Signal Conditioner

During receive, the station transceiver is tuned to an RTTY signal so that the mark and space audio tones (assuming 170 Hz shift) presented to the interface are nominally 1015 Hz and 1185 Hz, respectively. These tones are passed through an 1100 Hz active band-pass filter comprised of three sections of an LM324, U1. The center frequencies and Qs of each stage are staggered to provide a filter response that is flat within 3 dB over a 275 Hz bandwidth.² Filtered mark and space tones are applied to limiter U2, which converts the tones to square waves of the same frequency. These are applied to the serial port's DSR pin for processing by *HamComm*. Software FSK detection is accomplished by measuring the period between low and high transitions. Because frequency is inversely related to period, it is a simple matter (conceptually, at least) for the software to determine whether a mark or space tone is being received.

Sharp-eyed readers may note an apparent inconsistency here: The circuit takes an analog input, performs some filtering and signal conditioning, and applies it to a serial port pin as a digital output. *Where did the A/D conversion occur?* In U2. A 741 op amp running open-loop for maximum gain, U2 effectively acts as a 1-bit A/D converter. Depending on the state of the limiter, its output will closely approach one of the 741's positive or negative rail voltages. Because these voltages are compatible with RS-232-C levels, the output of the limiter is also compatible.

TR Switch

During transmit, *HamComm* causes the RTS line to go positive. This voltage turns on Darlington pair Q1/Q2 to pull the transceiver's PTT line low. That switches the transceiver from receive to transmit. Operating voltage for low-pass filter Q3 is derived from the RTS line as well.

FSK Generator

HamComm tells the hardware to output a square wave on the TxD line at a frequency equal to the desired AFSK tone: either 1015 or 1185 Hz, depending on whether a mark or space is being transmitted. This square wave is clipped by D5 and D6, then applied to low-pass filter Q3 and band-pass filter U1D. The two filters attenuate the odd-order harmonics and ensure that a reasonably clean sinusoidal waveform is applied to the transceiver's microphone input.

HamComm's choice of mark and space frequencies is a compromise. Initially, I used a center frequency of 700 Hz reasoning that the lower frequency would make it easier to achieve the desired receive-filter

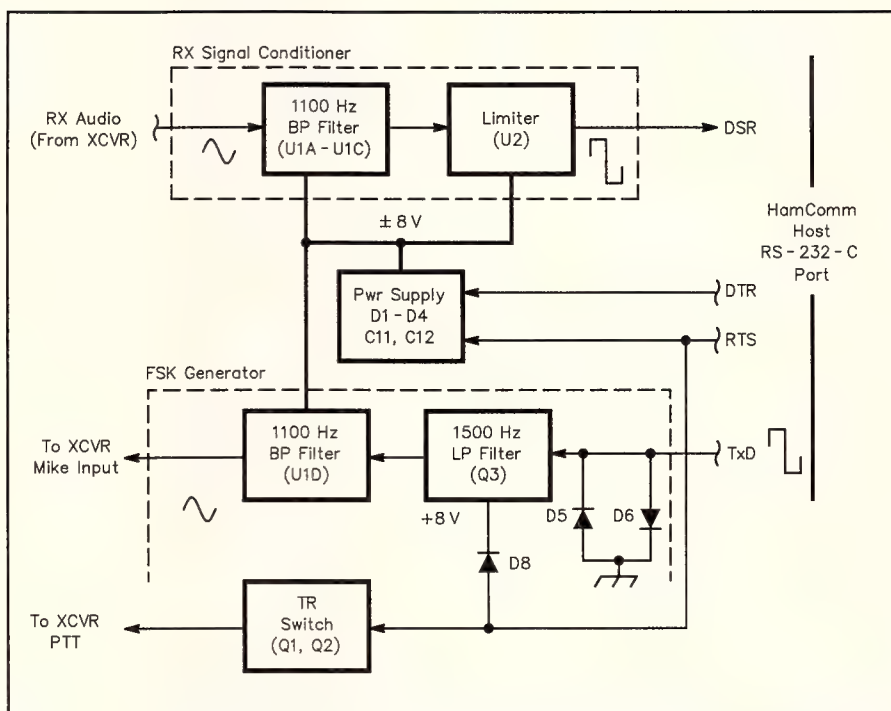


Figure 1—Simplified block diagram of the VolksRTTY interface.

band-pass characteristics. During tests, it became apparent that the FSK generator did not provide sufficient attenuation of the third harmonic of the square wave input. This harmonic manifested itself as a spurious FSK signal during transmit which, although barely discernible, had the potential to interfere with other QSOs. After considerable experimentation directed toward improving the harmonic attenuation, I finally threw in the towel and moved the center frequency to 1100 Hz. This puts the weak third harmonic pair at 3045/3355 Hz, which is sufficiently outside the band-pass of a modern SSB transceiver's filter to ensure a clean signal.

Construction

VolksRTTY can be built on a PC board, perf board with point-to-point wiring, or even "dead-bug" style (see Note 1). Neither lead length nor component layout seems to be particularly critical. My interface was initially installed in a plastic box, as shown in the photograph. With a transmitted power output of 400 W on 40 and 20 meters, I had no problems with RF feedback. Later, after changing antennas, I did encounter some difficulty when operating on the higher bands. Since then, I've packaged the interface in an aluminum enclosure, and the RF problems have disappeared.

Pay close attention to the values and tolerances of the resistors and capacitors associated with U1A through U1D: Use the values specified, ideally with 5% or better tolerances. With the exception of the 0.1-μF coupling capacitors, these components establish the passband characteristics of the

1100 Hz band-pass filters.

The 0.01 μF capacitors called for in the parts list are specified by the distributor as 10% tolerance components. My experience with several hundred of these capacitors is that nine out of ten are within 3% of their nominal value. If you have a means of accurately measuring their values, install those with the greatest capacitance in stage U1A and those with the lowest capacitance in stage U1B. Use the ones closest to nominal in stages U1C and U1D. This approach broadens the filter response curve a bit and makes it flatter. If the capacitors are randomly selected, there is a tendency for the tolerance build-up to cause the filter bandwidth to be somewhat less than the design target of 275 Hz. If you aren't able to measure the capacitor values, don't be concerned—the impact on operational performance is quite modest, providing you use capacitors that are within a few percent of the specified value.

Avoid the temptation to replace the specified op amps with hotter devices—at least until you get the circuit working with those called for in the parts list. This is because many devices with greater gain-bandwidth products also have healthier appetites for power supply current. The excessive current draw causes VolksRTTY's rail voltages to sag, and the circuit ceases to operate.

Installation and Checkout

First, acquire the software, *HamComm* V3.1 (see Notes 1 and 2). Copy it to an appropriately named subdirectory on your computer's hard drive (eg, C:\HC), and ex-

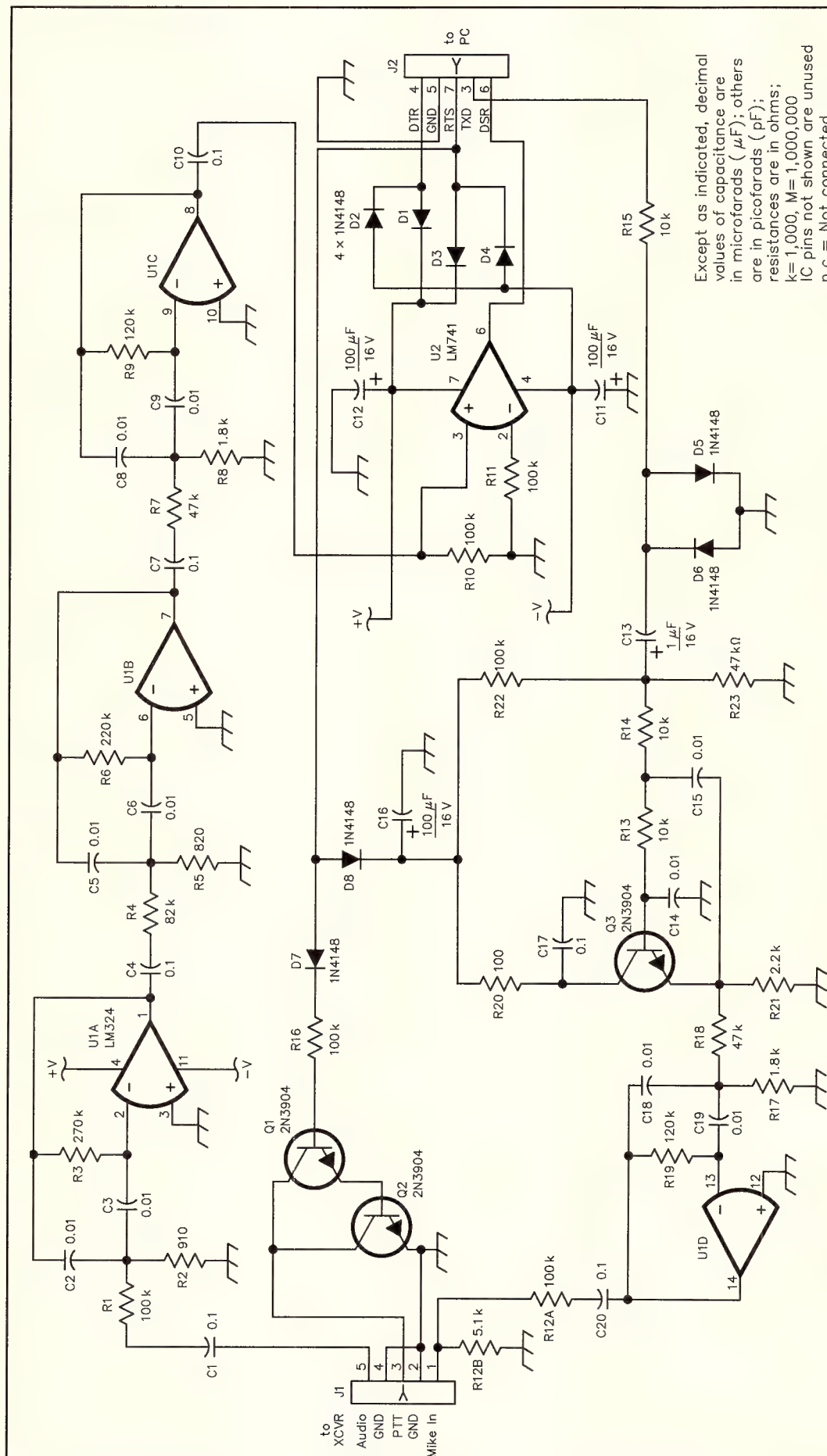


Figure 2—Schematic of the VolksRTTY modem. Unless otherwise specified, resistors are $\frac{1}{4}$ W, 5% tolerance carbon-composition or film units. Part numbers in parentheses are Jameco; equivalent parts can be substituted. Jameco Electronic Components, 1355 Shoreway Rd, Belmont, CA 94002; tel 800-831-4242, 650-592-8097; domestic fax 800-237-6948, 650-592-2503; international fax 650-592-2503; e-mail info@jameco.com; <http://www.jameco.com>

C1, C4, C7, C10, C17, C20—0.1 μF , 50 V (135562)
C2, C3, C5, C6, C8, C9, C14, C15, C18, C19—0.01 μF , 50 V (26884)
C11, C12, C16—100 μF , 16 V (94289)
C13—1 μF , 16 V (94160)
D1-D8, 1N4148 (36038)
J1—5-pin PC-mount DIN connector (29399)
J2—9-pin PC-mount female connector (104951, DE9S318)
P1—5-pin DIN plug; mates with J1 (15878)
Q1-Q3—2N3904 or 2N2222A (38359)
U1—LM324 (23683)
U2—LM741 (24539)
Misc: IC sockets, hardware, 6-foot-long, 9-conductor cable with DE09 male/DE09 female connectors, mates with J2 (25700, monitor extension cable); 4.9x2.5x1.5-inch (LWD) plastic enclosure (18913); see text.

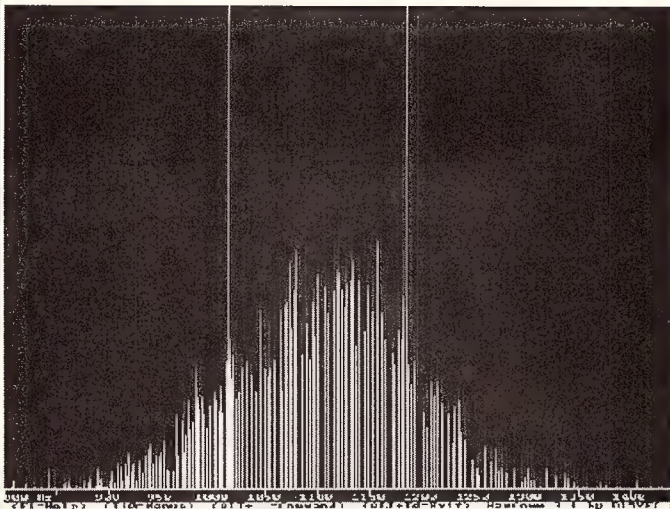


Figure 3—HamComm's "spectrum analyzer" tuning indicator with no signal present.

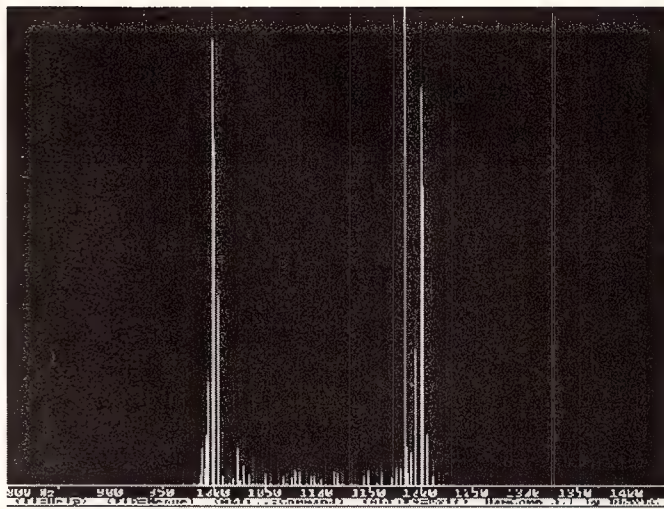


Figure 4—HamComm display of a properly tuned RTTY signal.

ecute it by typing **HAMCOM31**. The program extracts a number of files and places them in the same subdirectory. These include the executable file (*HC.EXE*), a configuration file (*HC31.CFG*) that defines HamComm's operating parameters and an extensive documentation file (*HC.DOC*). Use your favorite text editor to open *HC31.CFG* and, at a minimum, make the following changes:

- Line 101—Change COM2 to COM1 (or the COM port that you intend to use).
- Line 214—Set **afcenter** to 1100.

There are a host of other parameters that may optionally be set at the same time. These include clock timing, AMTOR timing, FSK polarity, literals containing your call, QTH, standard text phrases and many others. The configuration file is largely self-documented; careful reading will, in most cases, be sufficient to figure out what a given parameter does and how it can be modified. When you have completed these changes, save the file (don't change the file name—it should be *HC31.CFG*) and exit.

Connect the VolksRTTY interface to your computer's serial port using an appropriate serial cable and, operating in the native DOS mode (the registered version of HamComm can be run as a DOS task under Windows 95; see Notes 1 and 2), execute HamComm by typing **HC** from the subdirectory containing the HamComm files. Measure the voltage at pins 4 and 7 of U2 with respect to ground. You should see +7 to +10 V on pin 7, and -7 to -10 V on pin 4. If these voltages are present, you can be reasonably sure that you have selected the correct COM port.

Complete connecting the interface to the transceiver's receive audio, microphone and PTT lines. Receiver audio can be obtained via a parallel connection to the speaker lines, or a plug partially inserted into the headphone jack. Either approach allows you to listen to pitch cues while you are tuning in FSK signals. The best choice

for microphone audio, PTT and ground connections is at the transceiver's front-panel microphone connector. Newer transceivers have RTTY ports, but in many cases they may not be compatible with the VolksRTTY interface without modification. For now, stick with the proven approach.

Set your transceiver to the USB mode,³ turn off any audio filters your transceiver may have and tune to a clear spot in the band. Press **F7** on your keyboard, and HamComm will bring up the "spectrum analyzer" tuning indicator. With the receiver's audio gain set at a normal listening level, you should see a display similar to that shown in Figure 3. If you want, the display can be expanded by pressing **PG UP** several times and then recentering the display with the arrow keys.

The two vertical lines in Figure 3 correspond to the frequencies at which HamComm expects the mark and space tones to occur. The shape of the noise spectra corresponds roughly to the filter response in the VolksRTTY interface. If your noise spectra looks like that of Figure 3, the band-pass filter is working as intended. If the spectra looks significantly different, check the wiring and components associated with U1A, U1B and U1C.

Once you have confirmed that the filter is functioning properly, set your transceiver to USB with an IF filter bandwidth of 2.7 kHz or so and tune around until you locate a strong RTTY signal. Adjust your transceiver's main tuning until you see a spectrum analyzer display similar to the one shown in Figure 4.

Your objective is to line-up the mark/space spectral lines of the RTTY signal with the vertical tuning lines. Once that is accomplished, press **F3** to return to the TX/RX window in baudot RTTY mode and observe the characters being printed out. You should see signs of intelligence. In the presence of severe QRM, QRN and/or

QSB, some of the characters may be corrupted. This can be minimized by selecting a narrower IF filter, if your transceiver is equipped with one. Because the bandwidth of a 45 baud RTTY signal is about 250 Hz, you don't want to use a filter that is narrower than that. Unlike SSB voice—which requires different sideband settings depending upon the band selected—with RTTY you can always use the same sideband and RTTY polarity. If you don't see recognizable text, confirm that HamComm is set to RTTY, 45 Baud, 170 Hz shift, and the appropriate polarity for your choice of sidebands. This is done by selecting the appropriate pull-down menus from the top of the screen using your mouse or by simultaneously pressing the **ALT** key and the first letter of the menu name.

After you have the receive mode functioning properly, check the transmit mode. Pick a clear frequency, turn the microphone gain to minimum (CCW), and press **CTRL-T**. You may hear the transceiver's TR relay pull in and an RTTY "diddle" sound from the PC speaker. Slowly advance the transceiver's mike gain until the plate (or collector) current is at approximately *one-half* the normal CW value. Because RTTY requires a 100% duty cycle, it's not a good idea to run more power than this unless your transceiver's operating manual provides direction to the contrary. Type a string of **RYs** and your call sign followed by a space. Observe that the plate (collector) current bounces around a bit. To stop transmitting, press **CTRL-T** or **CTRL-BACKSPACE**. The former switches you to receive mode immediately, while the latter switches only after HamComm's transmit buffer is emptied. Once everything checks out, you're ready to start looking for your first RTTY QSO!

Operating

An RTTY QSO is very similar to one on

CW. With your RIT off, tune around until you find an RTTY station calling CQ. Even before the operator signs, you can start composing your call to the other station, eg, **W7QC W7QC DE K7SZL K7SZL K CTRL-BACK SPACE**. When the other station signs, press **CTRL-T**. Your transceiver will switch to transmit and the text you entered into the transmit buffer will be sent. When the buffer is empty, *HamComm* automatically switches your transceiver to receive. If you've gotten this far, you understand enough of the basics to successfully complete the QSO. You're on your way!

AMTOR is another digital mode that is supported by *HamComm*. Sadly, the number of stations using AMTOR has declined dramatically over the last two years as PACTOR has gained popularity. Nonetheless, AMTOR is much more robust than RTTY in weak-signal conditions and is a blast to operate! It's a mode unlike anything else you have ever operated—essentially, the other station can take control of your transceiver!

The full procedure for setting up an AMTOR ARQ QSO is beyond the scope of this article.⁴ You can get a small sample of AMTOR's advantages by copying the ARRL bulletin. Most bulletins are initially transmitted on RTTY at 45 bauds, followed by AMTOR FEC at 100 bauds. At the completion of the RTTY portion, you will hear several seconds of a constant carrier, then a different sounding FSK signal will appear. When this happens, press **F5** to enter the AMTOR FEC mode and, after a moment or two, you should see the bulletin text displayed. Hits caused by noise and fading don't affect AMTOR FEC to the same degree as they do RTTY. This is because AMTOR uses a forward error correcting code (that's the FEC) that allows the receiver to automatically correct for bit errors that occur during transmission. This is also a good time to set your clock correction (a mandatory step if you intend to operate AMTOR). Instructions describing this process can be found in the *HamComm* documentation file.

Summary

HamComm and the VolksRTTY interface provide an easy and economical way to get started on the digital modes. Hardware requirements for the host computer are very modest—even that old XT gathering dust in the corner of your garage will work with only minor limitations. The VolksRTTY circuit uses easily obtained, inexpensive components and is noncritical in its construction. Any homebrewer who has successfully mastered simple power supplies and audio circuits should be able to obtain the parts and construct VolksRTTY in an evening or two.

Remember: *HamComm* is shareware. As such, the author, DL5YEC (Django), expects that after 30 days of using the evaluation copy, you will send him a pay-

ment of \$30 US for the registered version of the program. There are minor differences between the evaluation and registered versions, the most significant of which are the addition of PACTOR receive and the ability to execute under Windows 95. DL5YEC has done a fantastic job with *HamComm* and, at \$30, this software is quite reasonably priced. To be ethical and fairly compensate Django for his considerable development effort, please forward the registration fee to him if you intend to use his software beyond the 30-day evaluation period.

Notes

¹A limited number of VolksRTTY parts kits are available from me. A semi-kit consisting of silk screened PCB, board mounted connectors and DIN-5 plug, is \$20. The complete parts kits including PCB, connectors, DIN-5 plug, ICs, sockets, resistors, capacitors and diodes is \$40. Add \$3 for a 3 1/2-inch floppy disk containing an evaluation copy of *HamComm* software and assembly instructions in text file format. Prices include shipping and handling in the US. Order from Terry Mayhan, K7SZL, 4517 159th Ave NE Redmond, WA 98052; e-mail tmayhan@accessone.com.

²See "Technical Correspondence," QST, Apr 1997, page 69 for a discussion of the impact of interface bandwidth on *HamComm* performance. An evaluation copy of *HamComm* is available from a variety of ftp and Web sites including the author's "Unofficial *HamComm* Home Page," <http://www.accessone.com/~tmayhan/>. A registered copy of *HamComm* is available for \$30 from W. F. Schroeder (DL5YEC), Augsburgs Weg 63, D-33102 Paderborn, Germany.

Note: The evaluation copy of *HamComm* will not run properly as a DOS task under Windows 3.1 or Windows 95. You must completely quit Windows and run/restart your computer in DOS.

³Old-timers may note that this is opposite from the conventional setting of LSB for HF RTTY operation using an SSB transceiver. The selection of sideband is actually arbitrary—you can set *HamComm* to "normal" polarity and use USB, or if you prefer LSB, make sure that you configure *HamComm* for "reverse" polarity. Polarity can be changed during operating with the **TAB** key. Whichever approach you choose, it's best to revise *HC31.CFG* to set the correct polarity at program start-up.

During the day and early evening, the best band for RTTY activity is 20 meters. Operation typically occurs between 14,080 and 14,090 kHz. Additionally, W1AW broadcasts the ARRL bulletin each day using RTTY on 3625, 7095 and 14,095 kHz at 6 PM, 9 PM and midnight Eastern Time.

⁴See Bill Henry, K9GWT, "Getting Started in Digital Communications, Part 4—AMTOR...and Beyond," QST, Jun 1992, pp 34-41 and 45, for an excellent tutorial on the theory and practice of operating AMTOR.

First licensed in 1962 as KN7SZL, Terry Mayhan has (until discovering HamComm) almost exclusively worked CW. He now holds an Extra license. After graduating with a BSEE in 1971 from the University of Washington, Terry was commissioned an Ensign in the US Navy. He served initially as a Surface Line Officer and later as an Engineering Duty Officer overseeing the construction of guided-missile frigates. During active duty, Terry was assigned to the US Navy Post Graduate School where he stud-

ied radar and communication systems, graduating with an MSEE in 1981.

Following release from active duty, Terry worked as a systems engineer on a space-based interceptor program for a large aerospace company before moving into technical marketing. He is currently employed as the sales and marketing manager for a company that manufactures communication equipment for police and fire dispatch centers.

In addition to CW and the other digital modes, Terry's interests include the design and construction of QRP transceivers, microcontroller projects, antennas and high-power automatic antenna tuners. You can contact Terry at 4517 159th Ave NE, Redmond, WA 98052; e-mail tmayhan@accessone.com.

QST

New Products

1998 CALLBOOK CD-ROM NOW FEATURES PREFIX MAPS

◊ The 1998 edition of the *Radio Amateur Callbook* CD-ROM adds features and value to its database of more than 1.4 million Amateur Radio operators. New features include prefix maps, more powerful search tools and many new data fields (such as previously held call signs, e-mail addresses and fax numbers).

The 1998 edition works runs in Windows and DOS and can exchange data with most modern logging programs. It also keeps track of club call signs ("then and now") and 54,000 QSL managers worldwide.

Price: \$49.95. For more information, see your local Amateur Radio products dealer or contact Radio Amateur Callbook, 1695 Oak St, Lakewood, NJ 08701; tel 732-905-2961, fax 732-363-0338, e-mail 103424.2142@compuserve.com.

MINI KEYS/PADDLE COMBO FROM G4ZPY

◊ Designed for QRPers, backpackers and mobile ops, G4ZPY's miniature twin-lever Iambic paddle has been paired with the TICK-2 miniature Morse code keyer made by Embedded Research. The high-performance combo, finished in polished brass, comes with magnetic mounts or rubber feet.

Features include support for Iambic modes A and B; a tune function; 3:1 weighting; selectable sidetone; low current consumption; paddle-input speed control; a 20-character memory and internal power (9-V battery).

Price: approximately \$200 plus shipping and handling. A personalized version costs about \$8 more. For more information, send an SASE (UK only) or an IRC to G4ZPY Paddle Keys International, 41 Mill Dam Ln, Burscough, Ormskirk L40 7TG, England; tel/fax 44 0 1704 894299.

QST

A Zenith Goes Home

This is a tale about a radio known in its time as “the Royalty of Radios”—the Zenith Trans-Oceanic. It tells how one radio affected different people in different ways at different times. But beneath it all is a story about Amateur Radio.

My Introduction to Boat Anchors

The story begins during the summer of 1994. I was perusing the aisles of the Gainesville, Texas, hamfest along with my Elmer, Gary Youney, K5QT.

Gary and I worked together. A year earlier, Gary had dropped a *QST* and the *ARRL Operating Manual* on my desk, hoping I might find them interesting. Indeed! In short order, I passed my Technician Plus exam. A few days before the hamfest, I got my Extra. I was on top of the world! In the midst of the hamfest crowd, I reasoned that I deserved to reward myself for passing my Extra. A flash out of the corner of my eye caught my attention.

Several aisles over, sunlight glinted off a radio I didn't recognize. Its big, round, pale sea-green tuning dial drew me closer. A Hallicrafters SX-42 followed me home that day. Such was my introduction to the world of old tube radios.

I couldn't know it at the time, but the boat anchor bug had bitten. I still had a lot to learn, however.

The Offer

By the winter of 1997, I had transferred to another part of the company and no longer worked with Gary. Late one afternoon at the office, after most people had already gone for the day, I was studying a world map on the wall of the coffee room. Another co-worker, Don Boley, walked in and wondered aloud why I was staring at the map. I explained that I was an Amateur Radio operator and was looking at the countries that I had not yet contacted. It turned out that Don's brother, Dick, is an active ham, N3HKN. This led to a conversation about the various aspects of the hobby.

After discussing DXing and contesting, our talk turned to boat anchors. Don said he had an old Zenith Trans-Oceanic at home.

I learned the radio had not been turned on in 35 years! He wondered if he should plug it in to see if it worked, but I suggested that might not be a good idea. Instead, I offered to check out the radio and see if I

could restore it. Now mind you, I had never seen a Zenith Trans-Oceanic nor did I know anything about them. But, mentally I was surmising, “new tubes, new caps, possibly a professional repainting of the cabinet. How difficult could it be?” The conversation soon was forgotten, at least by me.

The Offer Holds

A couple of months later, Don called me into his office. There, I caught sight of what looked like a dirty, scuffed black briefcase on a table. I didn't give it a second thought as I sat down. But, he walked over to the “briefcase” and flipped up the front cover, introducing me to a rather forlorn Zenith Trans-Oceanic H500. The case was separated, and, of all things, covered with ragged and dirty fabric. So much for the professional repainting theory. The dial was barely visible behind a plastic window clouded with age. There were cracks in the plastic. The back would not open as it was supposed to. This was beginning to look a lot like a “parts” set. Taking an even closer look, my heart sank. This was an impos-

sible task! Even if I could get the radio working electrically, how could I ever restore it cosmetically? Already I was regretting my offer. But, I *had* offered...

Don told me the radio's history. It had belonged to his older brother when they were kids. Over time, it ended up in his mother's attic, and later, it almost wound up in the trash. As far as he knew, his brother had not seen the radio in decades and had forgotten about it.

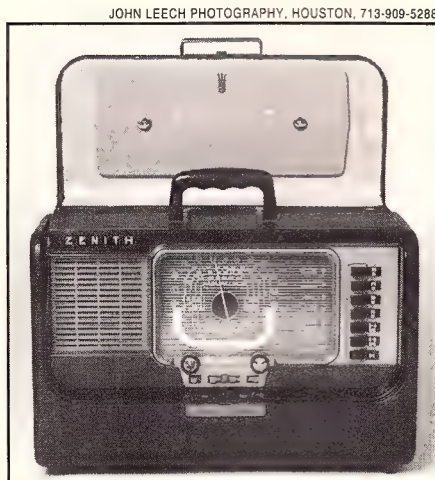
Then, Don dropped the bombshell.

He wanted to know if I could restore the radio so that he could give it to his brother as a 60th birthday present the following year. He was sure his brother would appreciate it. After all, this same dirty, scruffy Zenith Trans-Oceanic sitting there on the table had introduced his brother to Amateur Radio some 45 years earlier and laid a path for his life and career. Through his interest in electronics and Amateur Radio, Dick Boley had gone on to a long and successful career in telecommunications and management at a large, well-known company.

Don recounted stories of his brother's shack in the basement. He remembered his brother working on radios that never had cabinets on them because they were always “works in progress.” He recalled how his father would bring visitors down to the basement and have his brother turn on the tubes, tubes that would light up the whole room. I listened in amazement, looking at the radio that had shaped his brother's life. This radio had a history and a personality. I didn't know how I was going to do it, but I had a mission.

A Plea for Help

That evening, I was finally able to get the back open, only to be greeted by a huge mud dauber's nest inside. The finest collection of cobweb specimens one could hope to find had become intertwined among the tubes and the tuning capacitor. Not an auspicious beginning by any stretch of the imagination. After completely disassembling and checking the unit, I elected to bring it up slowly using a Variac.



The refurbished Zenith H500 Trans-Oceanic.

Meanwhile, I also sought some advice. I had no idea what to do with the case, and I needed a schematic. A Mayday went out over the Boat Anchors Reflector¹ on the Internet.

The Variac was up to maximum and no smoke... a good sign. As I tuned the radio with the volume cranked wide open, I was blasted by silence. Not a sound. Not a single static crackle. Not even a hum. Very likely the 3V4 audio tube was bad—probably along with the rest of the tubes. But this is what Elmers are for. A quick call to Gary—during which he mentioned that he also happened to have a Zenith Trans-Oceanic—turned up a spare 3V4.

I got maybe a half dozen e-mail responses, all with the same advice: use black shoe dye and paste wax polish to restore the case. I tried to imagine what that would look like. To say the least, I was skeptical. Another message advised where I could get a set of schematics.

Let's see. What tubes does this little fella have? Assuming the tubes in the radio were the right ones, I counted one 1U4, two 1U5s, one 1R5, and a 3V4 (plus a spare set). The next day, I placed an order for the tubes and schematics. Replacing the 3V4 with the one I'd gotten from Gary, I was now greeted by static. Progress!

When the tubes and schematics arrived, a folded piece of paper greeted me as I opened the box. It contained instructions on how to modify a 1R5 to replace the 1L6 in the Zenith Trans-Oceanic. Huh? What 1L6? Digging through the box, I found the schematic. Sure enough. It showed the tube lineup for my set as one 3V4, one 1U5 or 1S5, two 1U4s, and a 1L6.

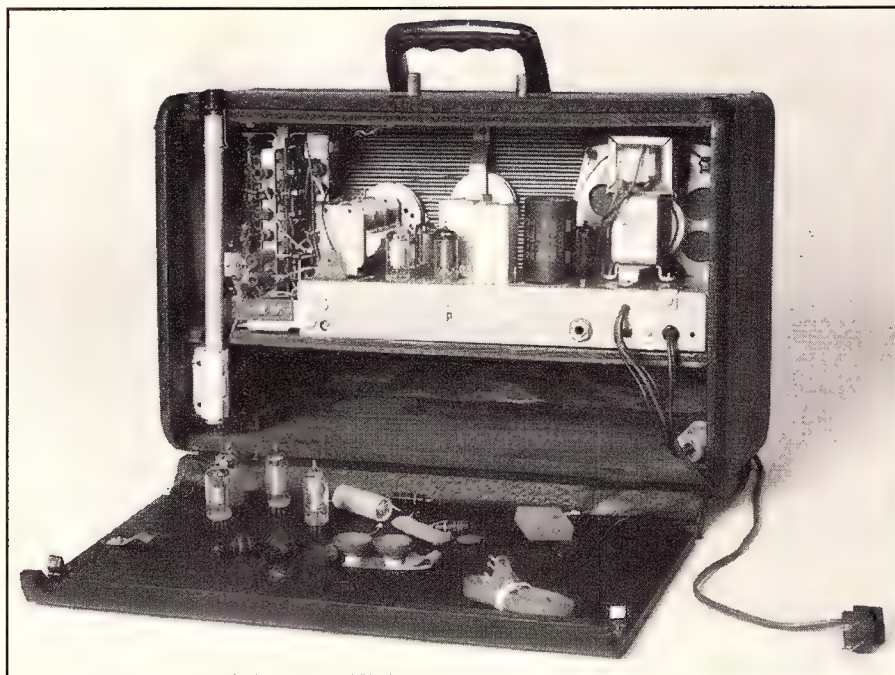
Now I had two problems. First, I needed a 1L6. Second, the count of 1U4s and 1U5s originally in the radio appeared to be wrong. With the spares I'd ordered, I had enough tubes—just no 1L6. Using a Dremel tool, I performed the recommended pin removal surgery on the 1R5 to make it compatible with the 1L6 wiring. After installing the tubes, it was time to try the radio again. A definite station! Only one to be heard on the Standard Broadcast band, but real music nonetheless. When was the last time real music had come through that speaker?

I continued to be curious about the 1R5. Was it *really* a suitable replacement for the 1L6? Responses from the Boat Anchors Reflector, such as "adequate on the broadcast band, not good on higher frequencies, and really requires realignment", were less than encouraging. Another question went out to the list. "Anybody know where can I find a 1L6?"

I got one ominous reply. "Good Luck. Those tubes are difficult to find." Not satisfied with having to settle for a 1R5 and discouraged at not having a lead on the correct tube, I put the radio aside for a while. Only "a while" turned into a couple of months.

A Second Attempt

It was now mid-summer. Rummaging through the shack one day, I stopped and



A look inside the H500 showing some of the replaced parts and tubes.

looked at the Zenith—resting in its new home on the end of the workbench. Enough procrastination. It was time for another call to the Boat Anchors Reflector. Information came back telling where to find the 1L6. Sure enough, a phone call the next day and two were on their way. Another phone call to my favorite electronics supply house and the capacitors were en route.

Capacitors and tubes arrived several days later. Plugging the 1L6 in with a quiet comment to the radio of "C'mon fella, you can do it," I turned the radio on and started tuning the BC band. Music, a local talk show, more music. Punching the 2-4MC button, I kept tuning. A South American station, a religious station, more music. The radio was alive! After 35 years, it was *really* alive!

As you might expect given the age of the filter capacitors, there was a definite hum in the audio. It was then that I made a mistake that cost me several weeks plus a certain amount of frustration. Using clip leads, I bridged the replacement electrolytics across each section of the existing filter cap, then turned the set on. The hum was still there but almost gone. Wonderful! Several evenings of replacing capacitors and it was time for the acid test. Turning the radio on, I started to tune. The stations were much clearer, sensitivity seemed better, an alignment was definitely needed, but that distracting hum in the audio was still there! I was baffled.

I spent evenings over the next several weeks trying to track down the source of the hum. Lifting the leads one by one on the electrolytics did not help. Another call to Gary. "Yep, sounds like power supply hum. Something is wrong with the filter capacitors or your wiring." More evenings of searching. Checking with a 'scope, I could

see the ripple. Obviously, I was missing something.

Then, it hit me! How could I have been so blind? I had only *bridged* the new electrolytics in parallel with the old filter capacitor sections, so my initial test with the clip leads was misleading. The old filter capacitor was leaky beyond belief! It needed to come out of there altogether. I made the necessary changes, reconnecting everything with clip leads to test.

By this time, the Zenith and I had developed a close personal relationship. We had nightly conversations. Once again, I whispered words of encouragement to the Zenith as I switched it on. There was that instantaneous pause as the 1-V tubes caught up with the current. The shack filled with deep, rich notes of music as the local AM station KQUE played *The Impossible Dream*. There was no trace of hum. I spent the remainder of the evening sitting in the shack, listening to the Zenith. The audio was simply beautiful!

The Final Stage

I completed the rest of the electrical work with only minor obstacles. During alignment, the dial cord broke. Inspection showed that the dial cord had actually been replaced at one time—incorrectly. Instead of being run through the slots in the chassis, it was wrapped around the tuning knob outside the chassis. Immediately I understood why. I wouldn't have wanted to take this thing apart either. It was also during alignment that I discovered the slug in the 19-meter antenna coil was wedged in with a small jagged square of rubber. I just laughed, "Dick OM, I can see exactly where you've been in this radio."

I approached the cosmetic restoration

process with some trepidation. After gluing and clamping the separated case and gluing the loose fabric back on, it was time to try the recommended dye-and-polish trick. Applying the dye, it began drying before I could finish the side I was working on. A sinking feeling grew in my stomach as I worked my way around the set. When I finished, I was horrified. The dye appeared uneven and streaked. I was convinced the radio was ruined, but there wasn't much I could do but let it dry.

Several hours later, I applied the wax shoe polish. I surveyed the results with cautious optimism. It certainly looked a lot better than with the dye alone. After attacking the case with a shoe brush and giving it a final rubbing with a rag, I carried the case outside into the sunlight. Wow!!! This looked good! In fact, this looked *great*! Encouraged and relieved, I turned to the final step.

I was concerned about the plastic front. Not only was it fragile and cracked, the dial window was clouded. My remedy of choice was Novus plastic polish, but I worried that the labels screened onto the inside of the plastic window might come off. Twenty minutes later, I held it up to the light. The window was perfectly clear. The labeling was intact. I had managed to clean and polish the whole front without breaking it or worsening the cracks.

Reassembling the radio, I sat there, admiring the final results. What had started as an impossible dream six months earlier was complete. "Little fella, you are one beautiful radio," I declared.

The Zenith Goes Home

It was time to give the Zenith back to Don, but I put it off for several days. I enjoyed having the set in my shack, and I really didn't want to let go of it. But, with some regret, I packed up the radio and a spare set of tubes with my schematics and notes.

I walked into Don's office and set the refurbished radio on the table where I'd first met it six months earlier. Don's eyes got big, and he smiled. Plugging it in, I flipped up the lid and turned it on. Once again, the deep, rich sound of a local AM station filled the air. Don didn't say a word as he tuned through the bands, stopping to listen to different stations. Finally, he spoke, "This is amazing. I'm not going to give it to my brother as a birthday present. I'm going to give it to him for Christmas. I want to be there so I can see the look on his face when he opens it."

Before I left, Don said he wanted a bill for the work. Laughing, I replied, "You can't afford the labor." But he insisted.

"Okay" I responded. "The 1L6s were a little pricey,² so I'll give you a bill for the tubes and capacitors." But I did ask for the right of first refusal if he or his brother ever decided to part with the set. "That radio and I have become good friends," I told him.

Later, I wandered back down to Don's



The restored Zenith B600 Trans-Oceanic.

office to say goodbye to the radio. I stood there looking at the Zenith, still sitting on the table, still singing its song. Reaching out for one last touch, I bid it farewell, thinking, "Good-bye, my friend. Maybe one day our paths will cross again."

Several days later, I left him an itemized bill for the tubes and capacitors. It came to \$105.31.

A Zenith Comes Home

A couple of weeks had passed when Don asked me to come down to his office. When I walked in, it was *déjà vu* as a vision of the dirty, ragged Zenith crossed my mind. With a mischievous glint in his eye, Don said, "I have a check for \$105 in my pocket, but I have something else that you may want even more. You have to make a choice."

I felt a little awkward and, at first, didn't quite know what to say. "Don, you don't have to do anything special," I said finally. "I simply enjoyed working on the radio, and I'm glad it turned out as well as it did." With that, Don reached down behind his desk, picked up a very familiar black "briefcase," and placed it on the desk.

I was dumbfounded. "He can't do this," I thought. "That's his brother's radio." But then I took a closer look and realized it wasn't the same set.

In that same instant, Don flipped up the front to reveal a beautiful Zenith Trans-Oceanic B600. As I sat there speechless, he flipped down the map case inside the lid to reveal the original station maps. Then he showed me the original owner's manual, stowed in the back compartment. Unfolding the original schematic, he held it up and said with a grin, "You can't do anything without this." There was no doubt in my mind that Don had carefully planned this moment, and was obviously enjoying every bit of it.

As he carried the Zenith over to the table to plug it in, I was finally able to get my voice back enough to ask, "Where and how did you get that?"

He explained. He had remembered when I'd mentioned that Gary also had a Zenith

Trans-Oceanic. Gary had acquired his Zenith a couple of years earlier from Tucker Electronics when they closed down their museum. He had not done any work on it, but it was museum quality. When Don told him why he wanted to buy it, Gary didn't hesitate to say yes. "It couldn't go to a better home," he told Don.

After Don finished his story, I told him I could not just accept this radio and offered to pay him the difference. Don's response was firm, "No. I know how you liked that radio. I can never repay you for what you did for me. This is the best way I know how."

At this point it dawned on me that Don never intended there to be a choice. I looked at the Zenith Trans-Oceanic sitting on the table. A good friend had come home.

Epilog—*Déjà Vu* All Over Again

This story has an unusual twist. While museum quality, the B600 had sat for a number of years, so minor restorative work was in order, including refurbishing the case and brass as well as an alignment. I completed the work in a couple of evenings and a weekend. The result was a beautiful, mint Zenith Trans-Oceanic, which was playing in my shack as I wrote this article. Just as I finished—literally on the last line—the song *The Impossible Dream* came on the radio again.

The next day at work, I showed Don a copy of this story. "This is amazing," he said. There's more here than you know. It has to do with *The Impossible Dream*."

I told Don about how I'd had the Zenith on while I was working on the story, and that just as I'd finished it, *The Impossible Dream* began to play again.

He just laughed. "Let me tell you something else," he said. "When my wife and I got married, we had a big wedding, 700 people. We each picked a song to be played for the wedding. One of my friends suggested *The Impossible Dream*. That was the song that was played at my wedding."

Larry Johnson, K5YF, 1806 Haver, Houston, TX 77006 (e-mail k5yf@wt.net) was first licensed in 1993 and holds an Extra license. Besides collecting boat anchors, his main ham radio interests are CW DXing and CW contesting. Larry holds a BS in geology from Virginia Tech and has been employed by Exxon in different information system technology positions for 20 years.

Notes

¹To subscribe to the Boat Anchors Reflector, send e-mail to listproc@theporch.com. In the message body, type "subscribe boatanchors <your name>". For more information, contact the list owner, Jack Hill, W4KH, e-mail listown@jackatak.theporch.com.

²As many Zenith Trans-Oceanic owners have discovered, the 1L6 tube can be extremely difficult to find, since it was designed primarily for use in the T-O, and rather expensive once you do. The much more common 1R5 has been somewhat successfully used (usually with the modification the author describes). A solid-state replacement also can be fabricated. See <http://www2.gdi.net/~padgett/116.htm> for more information—Ed.

QST

Antenna Ads in ARRL Publications

After more than 35 years, antenna manufacturers may once again advertise performance figures in League publications. Why has this changed and what should the astute amateur consumer be looking for in an antenna ad (or a product brochure)?

Since 1933, *QST* has administered an Advertising Acceptance Policy, designed "to protect ARRL members from companies that offer unsatisfactory products and services, deal dishonestly or unfairly, and/or misrepresent their products and obligations." This policy applies to all products advertised to the amateur market in League publications.

Many types of measurements on amateur gear can accurately be performed in the laboratory. For example, the ARRL Laboratory can easily verify a claim for harmonic suppression in a linear amplifier, or a claim for a receiver's dynamic range. Back in the early 1960s, however, some antenna manufacturers became engaged in a "horsepower race" with each other—and they stretched the credibility of their advertising claims to the breaking point.

The ARRL Lab folks are a talented bunch, with access to lots of top-notch measuring equipment. Even they, however, would have a tough time verifying the absolute gain of, let's say, a 3-element 80-meter Yagi by actually measuring the performance of such a beast! Indeed, accurately validating the gain of even a small 2-meter Yagi is not an easy thing to do. Absolute, repeatable measurements of gain and pattern measurements for antennas are very difficult, unless one has access to a large professional antenna range and to very sophisticated (and expensive) measuring equipment.

Back in the 1960s, rather than allowing misleading ads that couldn't be validated with verified in-field measurements, the League simply amended its Advertising Acceptance Policy to forbid *any* advertising of specific antenna performance figures, such as forward gain, front-to-back ratio or radiation patterns.

Some 35 years later, the problems involved in real-world antenna measurements haven't changed much, but the state-of-the-art for both software and computers has advanced tremendously. At HQ we now have desktop computers with greater number-crunching capability than a typical early-

1990s mainframe computer. More importantly, the ARRL now has available in-house the very latest software for antenna modeling. We are now using models previously available only to research universities and firms doing secret military work.

The ARRL Board Acts

We all know that the main purpose of a product advertisement is to catch the attention of a prospective customer—and to entice him to buy that particular product. From the beginning, the ARRL Board of Directors has promoted the dissemination of reliable technical information in League publications. The key is to ensure that performance claims are indeed reliable, using consistent methodology so that ARRL members can make intelligent buying decisions.

At the January 1998 meeting, the Board thus set in place certain rules to ensure that the interests of ARRL members are protected when antenna performance figures are claimed in an ad. Advertisers must submit their antenna computer models, and the ad itself, to the ARRL Laboratory for validation *before* they can advertise performance claims in League publications.¹

Highlights of the New Ad-Acceptance Policy

The new policy continues to allow a manufacturer to advertise actual measurements made using a certified antenna test range. The test range must qualify under the very rigorous EIA (Electronic Industries Association) standard called RS-329, Part 1. (You might be interested in knowing that for the last 35 years only one antenna manufacturer has availed himself of this option, simply because the expense of making such certified measurements is quite high.)

Modeling Software

Once an advertiser has submitted his modeling files to the ARRL Laboratory, the Lab will validate the models, using one of

two software packages. The first is *NEC-4*, the latest of a long line of general-purpose Method of Moment programs developed and validated by the US government laboratories at Lawrence Livermore National Laboratories.² The second is the *YO* program (*Yagi Optimizer*, by K6STI), which is designed strictly for evaluating Yagi antennas.³

Many readers are already modeling antennas on their own, often using some version of *NEC-2*, an earlier generation of the *NEC-4* program. The native *NEC-2* code is available on the Internet and is the core for several commercial modeling programs. *NEC-2* is very powerful and can properly evaluate many, but not all, amateur antenna designs. The newer *NEC-4* program has numerous accuracy enhancements, making it the most appropriate standard for the ARRL Lab. (Note that older software based on the original *MININEC* code, also widely available on the Internet, is essentially obsolete for this discussion.)

NEC-4 can be used to analyze almost any type of antenna used by amateurs, Yagis included. The advantage to such a general-purpose modeling program is its versatility, but its drawback is its slow operating speed, especially when analyzing a Yagi. *YO*, the Yagi standard-bearer in the ARRL Lab is custom-designed only for monoband Yagis. *YO* is hundreds of times faster in operation than *NEC-4*.

Brian Beezley, K6STI, has been developing the *YO* program since the late 1980s. As the name *Yagi Optimizer* implies, the software not only analyzes monoband Yagis, but can also optimize them, using parameters set by the designer. Over the years, Beezley has polished *YO* to a highly refined state.

YO was the program used by the League to create the many optimized Yagi design files on the diskette bundled with both the 17th and 18th Editions of *The ARRL Antenna Book*. (Also bundled with these editions is the "little brother" of *YO*, called *YA*, standing for *Yagi Analyzer*. *YA* does not optimize a Yagi design, but it can accurately analyze the performance, since it uses the same core algorithms that its bigger brother *YO* uses.)

¹Notes appear on page 56.

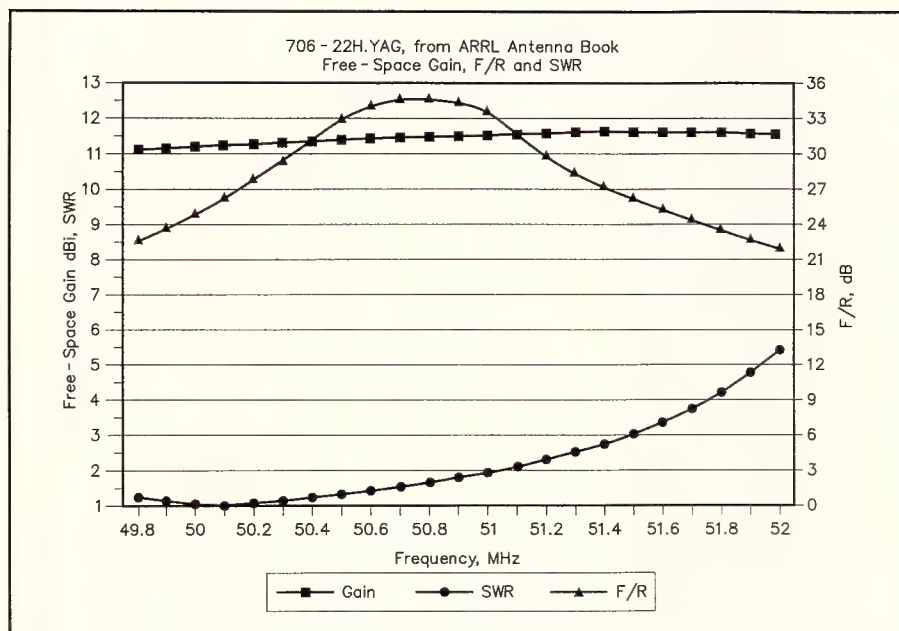


Figure 1—Graph of gain, F/R (front-to-rear ratio) and SWR over the 49.8 to 52.0-MHz range for 706-22H Yagi from *The ARRL Antenna Book*. The gain peaks at 51.6 MHz; the F/R peaks at 50.7 MHz. The matching network has been adjusted for a 1:1 SWR at 50.1 MHz.

Improved Designs

Sophisticated modeling tools such as these have led to many improved antenna designs. In particular, many modern-generation Yagis perform far better than antennas available in the old, pre-computer days. Ten years ago, the process of “designing” a Yagi consisted of tweaking an element length or spacing by a fraction of an inch, raising the test antenna up in the air, measuring the resulting pattern, and then lowering the antenna for another tweak. The painstaking process of tweak-and-raise-and-measure-and-lower might go on for hundreds of iterations before the experimenter got tired, distracted or confused and then decided to call it quits, freezing the design at that point!

Nowadays, in the course of five minutes, a fast computer using *YO* can do *tens of thousands* of iterations to optimally configure a multi-element monoband Yagi for whatever performance parameters are deemed important to the designer. Designs created using *YO* have been built and validated by many individuals and manufacturers alike. Virtually all commercial Yagis are now designed in software before going into production.

One note of caution should be raised at this point: Yagi design using optimizing software such as *YO* is not entirely science—there is some “art” involved as well. We’ll delve more deeply into this important topic later in this article, when we describe what to look for in an ad or a catalog brochure.

Other forms of directional antennas have benefited from computer modeling as well. Over the last 30 years, successive generations of *NEC* programs have improved the analysis of various geometries that used to give problems—such as tapered aluminum-tubing elements or wires joining at acute

angles (such as are used in quads). Again, this is not to say that every possible type of antenna can be evaluated accurately using modern software, but the vast majority of antennas actually found in the amateur market can be.

NEC-4 is the very latest computer code for antenna modeling, but it is highly regulated in distribution because of government national-security restrictions. The ARRL was graciously allowed to use the software because of our unique position in the field of Amateur Radio. *NEC-4* is also relatively expensive, at \$850 for the uncompiled Fortran source code—you must compile it yourself for your own computing platform. It is unlikely that many amateurs will have access to *NEC-4*, except for the fortunate ones who use it at work. But then again, how many hams have access to \$30,000 spectrum analyzers or \$15,000 synthesized signal generators to make sophisticated receiver or transmitter measurements themselves?

What Must Appear in an Ad

One goal of the new ad-acceptance policy was to set up as few restrictions as possible for the advertiser, while still protecting the interests of our members, of course. The Board required that at least one fundamental property *must* be shown if *any* performance claims are made—the gain in free space at a specified frequency. This must always be shown referenced to a free-space isotropic antenna, meaning that gain must be shown in dBi. If the advertiser wishes to show, in addition, the gain with reference to a half-wave dipole in free space, he can do so by showing both dBi and dBd.

There is a fixed relation between gain in dBd of a half-wave dipole in free space and

gain in dBi of an isotropic antenna in free space: The gain in dBd is always 2.15 dB less than the gain in dBi. For example, a 7-element 6-meter Yagi on a 22-foot boom from *The ARRL Antenna Book* might be shown as:

Model 706-22H—11.36 dBi (9.21 dBd) free-space gain at 50.2 MHz.

This type of listing meets the minimum requirements for the new policy and it gives useful information for a potential customer to compare one product with other ones.

Covering the Band

Most hams operate over frequency ranges rather than on spot “channelized” frequencies. The ARRL Ad-Acceptance Policy encourages as much disclosure of performance as possible—to show the warts and all, so to speak. Many antennas, particularly shortened designs, are narrowband in nature; some are very narrowband. Where ad space is available, we feel that radio amateurs deserve to know the trade-offs inherent in any particular design.

While gain is often considered the most important single measure of an antenna’s performance, the shape of the radiation pattern and the SWR at the feed point are also very important parameters. And the way the gain, radiation pattern and SWR all change with frequency reveal a great deal about the design of an antenna.

Let’s look again in more detail at the 7-element 706-22H Yagi just described above, but this time over the frequency range from 49.8 to 52.0 MHz. Figure 1 shows the computed performance, with gain, F/R and SWR overlaid together on the same graph. Here, the match has been adjusted for a 1:1 SWR at 50.1 MHz, yielding a 2:1 SWR at roughly 51.0 MHz. At 52.0 MHz, the SWR rises to over 5:1.

You can see that the gain rises gradually, peaking at 51.6 MHz, while the F/R (worst-case front-to-rear ratio) peaks at 50.7 MHz, at almost 35 dB. The rearward pattern remains more than 20 dB down from peak response over the whole range from 49.8 to 52.0 MHz. Note that the matching network could be adjusted for a 1:1 SWR anywhere from 50.0 to 52.0 MHz, and the Yagi’s performance would still be excellent at that frequency.

Note that we chose to display the F/R performance parameter in Figure 1, rather than F/B (front-to-back ratio). We feel that F/R, which describes the worst-case lobe occurring anywhere in the rearward hemisphere behind the antenna, is a more useful performance parameter for directional antennas than is F/B. The details are covered fully in Chapter 11 of *The ARRL Antenna Book* (in the 17th and 18th Editions), but the main reason is that unwanted signals don’t always come from directly behind you—interference can come from any direction.⁴

Showing just the front-to-back ratio can be potentially misleading. For example, the 706-22H antenna has an F/B of almost 50 dB at 50.7 MHz. A completely legitimate, but incomplete description of the three performance figures for this Yagi might be:

Model 706-22H

Free-space gain = 11.72 dBi at 50.6 MHz
F/B = 49.1 dB F/B at 50.7 MHz
SWR = 1:1 at 50.1 MHz.

As already noted, this antenna has an F/R of almost 35 dB at 50.7 MHz, an excellent number to be sure, but not as spectacular as more than 49 dB for the F/B. Clearly, the old adage that "one picture is worth a thousand words" is particularly poignant in the field of antenna performance. The graph in Figure 1 depicts the performance of the antenna in a far more comprehensive fashion than any table of numbers could.

To an advertiser, however, the drawback to the kind of graphical presentation in Figure 1 is that more ad space is needed for each model of antenna advertised, raising the ad cost. Many advertisers will choose to print such detailed graphical information only in their product brochures, rather than putting it all in expensive print ads. As a consumer, you should petition those manufacturers who don't provide such detailed information to do so!

Most 6-meter weak-signal activity occurs in the bottom 300 kHz of the band, so someone might legitimately ask the question about Figure 1: "Why extend the performance so high in the band?" The answer is that if an antenna is highly optimized for maximum gain in a narrow frequency range, the design will be in all likelihood very "touchy" in terms of dimensional tolerances. The performance may even drop off precipitously (pun intended!) in precipitation such as rain or snow. This is where "art" is involved, as well as science. A more conservative design may compromise the maximum gain slightly, but it will favor performance over a wider bandwidth, in all types of weather. This is what was done for the 706-22H Yagi.

What About Gain Over "Typical" Ground?

The advertiser may want to show performance over real ground in an ad. There's nothing wrong with this approach, provided that performance over ground is advertised in addition to that in free space.

Some additional conditions arise for computations done over ground. First, the ground model used must be the "Sommerfeld/Norton" ground model in NEC-4, with "typical" ground constants of 5 mS/m for ground conductivity and a dielectric constant of 13. Further, the terrain surrounding the antenna is assumed to be flat. These restrictions preclude the use of the simple "perfect-ground" or "MININEC-ground" models, which both can inflate performance claims considerably.

Some antennas are optimally tuned to operate over specific ground conditions. For example, I used NEC-2 to design the 75/80-meter quad at N6BV for a specific height above ground, 115 feet.⁵ If I changed the model conditions to free space, the carefully optimized F/R would degrade from 20 dB down to about 10 dB. If for some reason I wanted to advertise this quad in QST, I would have to submit two files to the ARRL Lab for validation. One would be optimized in free

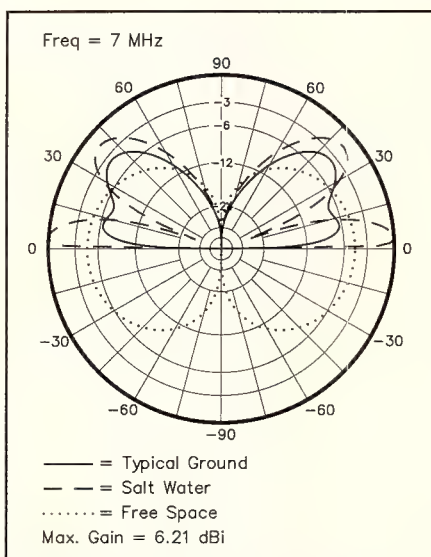


Figure 2—Comparison of elevation-plane patterns for 7-MHz ground-plane antenna, whose radial tips are located a half-wave above three ground models: free space (dotted line), "typical" ground (solid line) and salt water (dashed line). It's pretty obvious that the performance of a vertically polarized antenna is best over salt water, particularly at low elevation angles!

space and the other optimized over real ground.

Other Types of Ground

In addition to free-space gain (and gain over typical ground), the manufacturer may also want to show performance characteristics for specific types of ground. For example, a manufacturer of verticals may want to show the gain over salt water. He may do so, provided that he also shows gain in free space and gain over typical ground (with conductivity of 5 mS/m and dielectric constant of 13).

Figure 2 shows a comparison of elevation patterns for a 7-MHz ground-plane antenna whose radial tips are a half-wave above ground (at 33 feet) for three ground conditions: in free space, over "typical ground" and over salt water. Note that the two patterns computed over ground cannot have elevation angles less than 0° because the ground blocks these angles, while the free-space elevation pattern can go below 0° because there is no ground in free space.

You can see that a vertical antenna mounted over salt water has a decided advantage compared to the same antenna located over typical earth. At a 5° elevation angle, the saltwater vertical has an advantage of about 8 dB over its landlubber brother. Here in New England, with our very poor, rocky soil, the advantage to the saltwater vertical is even larger.

Incidentally, we don't expect many manufacturers of non-gain antennas, such as dipoles or verticals, to specify gain, F/R or F/B in their ads. After all, the gain for a vertical over typical ground is often less than 0 dBi, and this doesn't show that well in an ad!

Modeling Losses

NEC-based programs can accurately model losses in several ways. The resistive loss in wires or tubing, often referred to as "copper losses" can be modeled, and discrete losses in traps or loading coils or stubs can be modeled as networks.

If the ARRL Lab finds that the feed-point impedance of an antenna model is suspiciously low, where losses in the matching network might become large, then they will ask the advertiser to submit a sample of his product for inspection. By the way, this is true for all products, not only antennas—all must undergo scrutiny before being allowed to advertise in ARRL publications.

Modeling Files on the Web

The ARRL encourages advertisers to allow us to post the modeling files they send for ad-acceptance validation to a special area on the ARRL Web site, at <http://www.arrl.org/antmodels/>. Knowledgeable users can download the files and explore the antenna designs using their own software. A number of prominent manufacturers have indicated their willingness to post their files publicly.

The files are available in one of three different formats: NEC-4 ASCII files, YO ASCII files, and EZNEC Pro binary files. The EZNEC Pro files are meant to be run using the NEC-4 core code. Many NEC-4 files can be run satisfactorily using NEC-2 software, but some will not. The files that will not run properly in NEC-2 based software (such as EZNEC or native NEC-2) will often include internal comments to this effect or will give error messages when the operator attempts to run them. Note also that Yagis having more than 17 elements or ones with multiple element-tapering schedules will not run in YA, although they will run in YO.

Final Comments

Although several wags have claimed that the new ad-acceptance policy must surely be designed to increase advertising revenue, that is *not* the reason the policy was changed! The desired effect is to improve the quality and quantity of antenna-related information available to help our members make rational purchasing decisions.

Notes

¹The full ARRL ad-acceptance policy may be found on the ARRL Web site, at <http://www.arrl.org/ads/#Policy>.

²As of February 1998, the latest version of NEC is NEC-4.1. This program is subject to export restrictions by the US government and is available to authorized US individuals or companies in the US from: Jerry Burke, Lawrence Livermore National Laboratory (LLNL), PO Box 808, L-154, Livermore, CA 94550.

³The YO (Yagi Optimizer) program is available from: Brian Beezley, K6STI, 3532 Linda Vista Dr., San Marcos, CA 92069, tel: 619-599-4962, e-mail k6sti@n2.net.

⁴The ARRL Antenna Book, 18th Edition (Newington: ARRL, 1997), pp 11-2 to 11-9.

⁵R. Dean Straw, "The N6BV 75/80-Meter Quad," *The ARRL Antenna Compendium*, Vol 5 (Newington: ARRL, 1996), pp 45-50.

The Radio Amateurs of Costa Rica

Meet the faces behind those "TI" call signs!

In 1997 I succeeded in what I could not do on two previous attempts: visit the amateurs of Costa Rica. Before every trip to a new country, I always write letters to the radio clubs and amateurs I've contacted from that country in the past. I originally wanted to make a tour of several Central American countries, but I dropped that idea because I did not receive solid leads. On this third occasion I wrote to hams in Costa Rica, Nicaragua and El Salvador, but I received answers only from Costa Rica, so I decided to go there.

The US has a reciprocal operating agreement with Costa Rica so it was not difficult to get a license. There are three categories of licenses:

A—The highest class, with all-band privileges and 1 kW power

B—The middle class, with all bands and 250 W power

C—The lowest class, 40-meter privileges only with 250 W.

On this trip I took along my daughter Diane, KB2KLV, who is working on her doctoral dissertation on forest conservation and is interested in rain forests. I have no interest whatsoever in muddy jungles, but I went with her on some of her field trips. We saw caimans, crocodiles, iguanas, sloths, howler monkeys, spider monkeys, and all kind of birds. Caimans and crocodiles I prefer to watch on television!

San Jose

When we arrived at the San Jose airport, Rodrigo, TI2RAO, the president of the Radio Club of Costa Rica, was waiting for us. We couldn't miss him in the crowds; he was holding up something like a license plate with his call sign.

First we dropped our luggage at the hotel, and then we started the visits. Rodrigo took us to Carlos, TI5KD (nicknamed Keko), who lives just outside San Jose. Carlos, a native of Minnesota, has several calls: KD4ZNB, YN1KDM and TI9W. His wife Sophia is TI2IY.

Next, Rodrigo took us to the Radio Club



William, TI5WMC, in Quesasa.



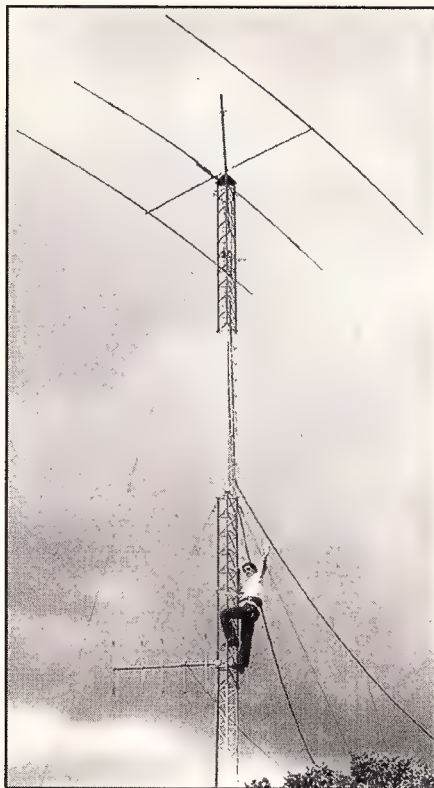
Armando, TI2AEB, in San Jose, prefers HF digital operating. *All photos by author.*

of Costa Rica (established in 1953), in the Zapote district of San Jose. There they have a modest 100 W station with wire dipoles; the call is TI0RC, although they use TI1N during contests or on special occasions.

Alajuela

From San Jose my daughter Diane and I took a bus (the cost was 120 colons, about 50 cents) to Alajuela, about 12 miles northwest from the capital. At the terminal we met David, TI5RLI, who drove us to the nearby Bella Vista. David is a Californian with several other calls.

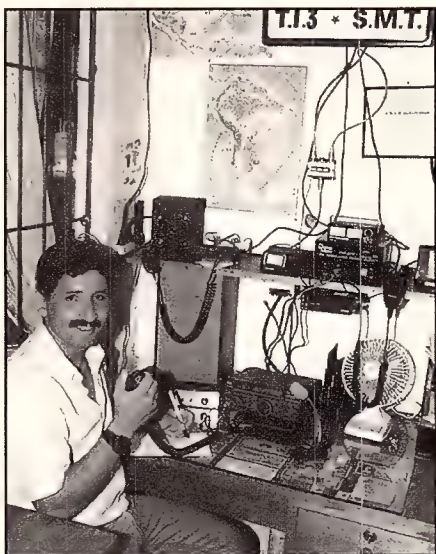
David took us to Alajuela to see Roberto, TI5RSH, the former president of



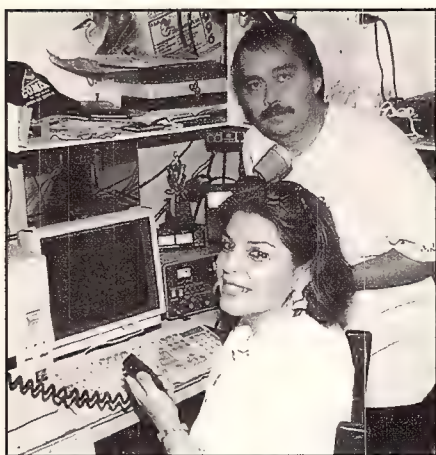
Rodrigo, TI2RAO, on his 50-foot tower in San Jose.

the local radio club TI0ARA. Roberto's wife Gabriela, TI5GGT, is the secretary of TI0ARA. Their station is in the back of their auto parts store. Roberto and Gabriela used to have an apartment above the store but the 1990 earthquake, when the Poas volcano erupted violently, destroyed the building. Since then, they rebuilt the store and built a new house.

Costa Rica has about 100 volcanoes, seven of which are active. The rich volcanic soil is excellent for farming and the population is accustomed to the frequent earthquakes. On the day of our departure, the Irazu volcano (elevation 11000 feet), near Cartago, east of San Jose, showed its



Sergio, TI3SMT, welcomes everybody in his radio room in Turrialba.



Mary, TI3AMY, and her husband Olbert, TI3OMY, at their station in Turrialba.

temper and we felt the results in our hotel room!

Turrialba

From Alajuela we journeyed to Turrialba, one of five cities in Costa Rica that boasts a radio club (TI0TRC). The members meet at the local fire station. The president, Olbert, TI3OMY, is a lab technician who specializes in collecting and analyzing blood. His wife Mary, TI3AMY, licensed also in 1980, is an architectural draftsman.

I met Sergio, TI3SMT, in front of a school where he has the food concessionary. Sergio, licensed in 1996, is a contesteer and a DXer. On the top of his 40-foot tower is a 3-element Yagi for 10, 15 and 20 meters, an inverted V for 40 meters, a 4-element vertically polarized Yagi for 2 meters, and a vertical for the same band.

Our next visit was with a family of three hams: husband Jose, TI3AMT; wife Lorena, TI3LAT; and daughter Nazira, TI3MNO. They own a clothing store attached to their house. Jose works for an insurance company

and he is the most active ham in the family. Lorena runs the store and Nazira is a university student. They have a very nice station with a 5-element Yagi for 10, 15 and 20 meters and a wire dipole for 40 meters.

Quesada

Next morning Rodrigo took us from the hotel to the bus going to Ciudad Quesada, in the province of San Carlos. The 68 miles ride costs 530 colons (about \$2.26) and lasted about 2½ hours.

Arriving to Quesada, we waited about 10 minutes at the bus terminal until Minor, TI5MLS; William, TI5WMC; and Manuel, TI5MMB; showed up. I wore a tee shirt I received from the Turrialba radio club, and a name tag with my call sign on it, so they recognized me easily. We walked to the house of Gustavo, TI5GCO, a university student. On the top of a tall tower he has a 3-element Yagi for 10 meters and another Yagi for 2 meters.

We enjoyed a pleasant visit at William's home first. He is a TV cameraman who began his ham career in 1995. On the top of a mast mounted on the roof, at a height of 33 feet, William has a 3-element Yagi for 10, 15 and 20 meters, a Yagi for 2 meters and a wire dipole for 20 and 40 meters. William operates primarily on SSB and SSTV.

We also stopped by Minor's station, TI5MLS. Minor is a teacher and his wife Sonia, TI5STL, is a librarian. Minor Jr, age 13, is licensed as TI5CGO. When you look at their antennas, it's easy to see where their interests are focused. They have a 10-element Yagi, a 3-element Yagi and a vertical—all for 2 meters!. For 10 meters they use an inverted V.

Of course, we couldn't pass up Manuel's home and station, TI5MMB. He and his wife Marlene, TI5GTS, live outside the city, high up on a mountain (elevation about 3000 feet). In addition to his flourishing ham activities, Manuel is a "vaquero" and has a cattle farm.

Next to see in Quesada was Carlos, TI5CET, an architect and interior designer. His tower is 23 feet high and sports a 3-element Yagi for 10 meters, a vertically polarized 2-element Yagi for the 2-meter repeater, and a wire dipole for 20 meters.

With Manuel we went to see Martin, TI5RAI, in the village of Santa Rosa. He has a 60-foot tower with a 6-element Yagi for 10 meters and a 3-element Yagi for 10, 15 and 20 meters. Martin is a DXer, but only on SSB.

We quickly formed a convoy consisting of Manuel and his family with us in one car, and Gustavo, Minor, and his family in a second car. Our destination was La Fortuna, near the Arenal volcano. After almost two hours of driving, we arrived at La Fortuna to find that the volcano was covered by clouds and the fiery eruptions could not be seen. There was a "feria" taking place in the town with hundreds of people moving around. Manuel and his company returned to their



Gabriela, TI5GGT, and her husband Roberto, TI5RSH, at their station in Alajuela.



Marlene, TI5GTS, and her husband Manuel, TI5MMB, at their mountaintop station near Quesada.

homes, but Diane and I had decided to stay. (At least I was able to grab a souvenir chunk of cooled lava.) The next morning we took a boat tour on Cano Negro River to a lowland rain-forest reserve and wildlife refuge.

What Did You Bring Me?

In nine days I visited 22 stations with 34 amateurs, took over 360 photos, and made several field trips. Upon my return, my dear wife asked me what I brought her from Costa Rica. I had to think quickly. Then, I remembered.

"A real piece of lava from an active volcano called Arenal, my dear!"

"Gee," she said, impressed. "Genuine volcanic lava? Wasn't that awfully hot?"

"Yes, dear, it was very hot. I had to blow very hard on it before I could put it in my pocket, but I did it for you!"

You can reach George Pataki, WB2AQC, at 84-47 Kendrick Pl, Jamaica Estates, NY 11432, e-mail wb2aqc@aol.com

QST

NEW HAM COMPANION

The Doctor is IN

Q Richard Stuart, WF7A, asks, "Would the use of a hefty isolation transformer between my ac wall outlet and my 12-V power supply do a better job of spike protection than the MOVs in my spike suppressor?"

A A hefty isolation transformer will merely pass any voltage spikes directly to your power supply. It affords you no spike protection whatsoever.

Perhaps you're thinking of something called a *constant voltage transformer*, which is designed to provide a clean output waveform—even when voltage spikes are present at the input. Constant voltage transformers are expensive; a Sola surplus unit goes for about \$270. A 500-VA unit, the smallest useable by many HF ham stations, weighs in at 42 pounds and costs nearly \$600!

Q What is the correct method for tightening UHF and/or N-type connectors and adapters after you attach them to your equipment?

A Marc Abramson, KC9VW, of Cable X-perts provides the answer ...

After properly mating any connector and/or adapter, the correct way in which to secure it, is to hand tighten *only*. This will provide sufficient electrical and mechanical connector integrity. Using a mechanical tool for mating connectors (such as a wrench or locking pliers) will likely cause overtightening and breakage. Just tighten the connectors with your fingers and that will do the job. Of course, don't forget to weatherproof any connectors used outdoors.

Q Tim Hendel, KC4BBI, asks, "I enjoy using my Lowe HF-225 receiver for HF monitoring, but I can only put about 15 feet of wire outside my window as a random-length antenna. Even with this mediocre setup, I'm able to hear quite a few signals. Unfortunately, I also receive a considerable amount of electrical noise. Would grounding the receiver chassis alleviate this problem?"

A While it's unlikely that grounding your receiver will have a significant effect on the level of the electrical interference, a good ground could possibly increase your receive signal strength. If you have a cold water pipe available near the radio, try grounding the radio to the pipe and see what happens. Even if the pipe does not actually provide an electrical path to ground, it might at least act as a counterpoise.

Beyond grounding the radio, you need to reduce or eliminate

the interference. You might want to pick up a copy of the ARRL book *Radio Frequency Interference: How to Find and Fix It*. It provides step-by-step information on isolating and fixing electrical noise problems. But if eliminating the interference at the source isn't practical, consider purchasing one of the noise-canceling devices on the market, such as those made by JPS or MFJ. They do a pretty effective job on this type of interference.

Q I want to put up a wire antenna for HF work, but I can't to install a "traditional" center-fed dipole. Is there any way I could feed it from the end? That would be a lot more convenient for my particular installation.

A As long as you observe some precautions, why not? When a straight-wire antenna is fed at one end by a two-wire feed line (such as 450-Ω ladder line), the length of the antenna portion becomes critical if you want to minimize radiation from the feed line itself. Such an antenna system for multiband operation is the *end-fed* or *Zepp-fed* antenna shown in Figure 1. The antenna length should be $\frac{1}{2}$ wavelength at the lowest operating frequency. The feed-line length can be whatever is most convenient, but try to *avoid lengths that are $\frac{1}{4}$ wavelength at any of your operating frequencies*. Otherwise you may encounter radiation from the feed line. Just connect the ladder line to a balanced-line antenna tuner and you're ready to go!

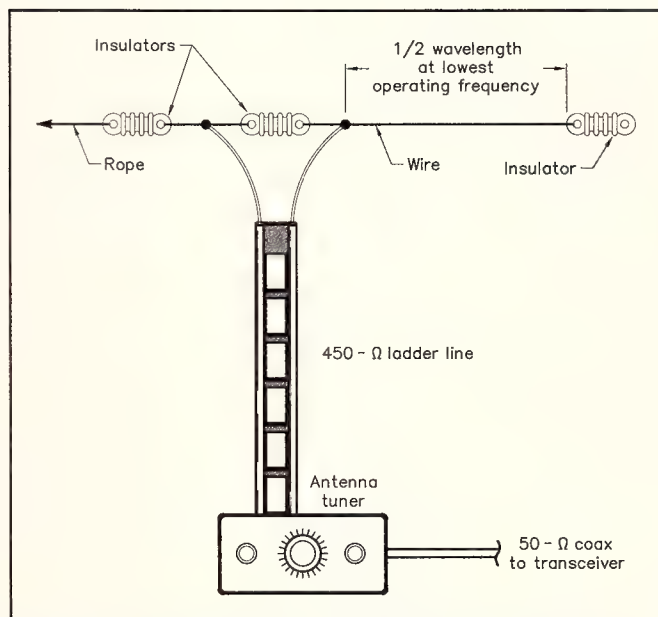


Figure 1—You can achieve multiband HF operation with an end-fed wire. Just make sure the feed line isn't a quarter wavelength at any of the frequencies you wish to operate.

Q I enjoy operating HF mobile, but it is difficult to maintain a log when you're driving. Any suggestions?

A Attempting to write down call signs and other data while driving is not only difficult, it's dangerous. Why not use one of those digital audio memo recorders or microcassette recorders? They're small, inexpensive and very easy to operate. Just dictate the contact details to the recorder, then transcribe the information to your "official" log when you stop.

Q I've heard that the so-called "rubber ducks" supplied with hand-held transceivers (H-Ts) are not very good antennas. Is this true?

A In terms of their ability to efficiently radiate signals, most rubber ducks are poor antennas. They're really little more than helical pieces of wire encased in flexible rubber or plastic.

They radiate, insofar as *any* piece of metal will radiate under the right conditions, but they don't do a very good job.

On the other hand, these flexible antennas are extremely durable. Considering the fact that H-Ts are often stuffed into car seats, jammed into coat pockets and operated under conditions that would snap a larger antenna in a heartbeat, they offer a reasonable compromise. Besides, H-Ts are designed primarily for use with repeaters whose sensitive receive systems compensate for the shortcomings of rubber ducks. If you intend to use an H-T at the fringe of a repeater's coverage area, replace the rubber duck with a longer telescoping antenna.

Q I'm planning to take a long train trip on AMTRAK and I'm going to bring along my H-T. In addition to whatever hamming I can enjoy on the way, is it possible to use my extended receive capability to monitor AMTRAK's communications?

A Yes, you certainly can. The frequency list, however, is rather long and complicated. It depends on which train you're riding and whose tracks you're riding on (ConRail, CSX, or whatever). You'll find an extensive list of frequencies on the World Wide Web at <http://www.trainweb.com/traking/amtrak/amtfreqw.html>. If you can't get to the Web, just set up your H-T to scan from 160 to 162 MHz. That's where you'll find most of the activity. Another tip: If you're travelling by coach, bring an earphone or headphones so your monitoring won't annoy your fellow passengers.

Q I want to build a crude signal generator for testing some of my little home-brew HF receivers. Can you suggest something that's quick and easy to build?

A The crystal-controlled generator shown in Figure 2 will function with crystals from 1 to 15 MHz, and provide useable harmonics up to 30 MHz. Bear in mind that an RF signal generator like this isn't suited for critical jobs such as receiver IF alignment, but it is good enough for a number of other test applications.

Q Miguel A. Echenique, N3WEV, asks, "When ordering a crystal, most manufacturers want you to specify the load capacitance. How do I go about determining this?"

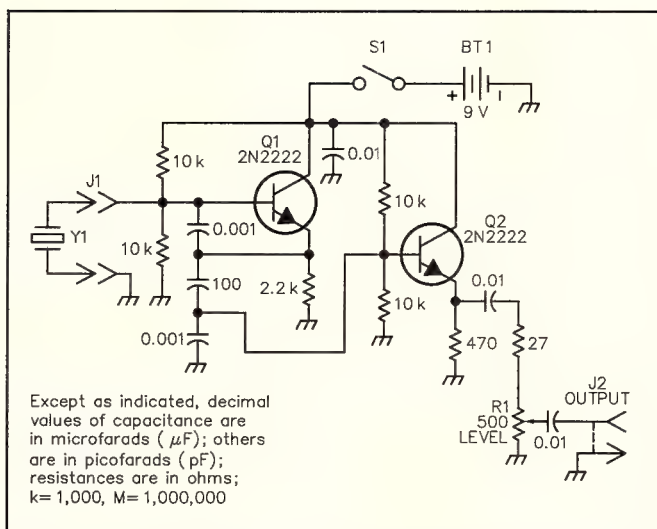


Figure 2—Schematic diagram of a crystal-controlled signal source. All resistors are $\frac{1}{2}$ W, 5% carbon types, and all capacitors are disc ceramic.

BT1—9-V battery

J1—Crystal socket to match the crystal type used.

Q1, Q2—2N2222 transistor

R1—500- Ω potentiometer

S1—SPST toggle switch

Y1—1 to 15-MHz crystal

A You need to carefully analyze the circuit. (In your case it is an oscillator.) One of the basic theorems of electrical engineering is that you can reduce a linear circuit to a very simple equivalent circuit—nothing more than a signal source and an impedance. Thus, the manufacturers are asking for the capacitance value of your simplified circuit. Admittedly, oscillators are not linear circuits, but a calculated approximation is usually close enough.

The catch is that most hams don't have the training to perform this level of circuit analysis. The crystal manufacturers know this, too. That's why most of them will allow you to simply send the schematic and let them figure out the load capacitance for the crystal you need. This is often the most practical approach.

Q I've recently heard of something called the Casimir Effect. The description sounded very strange. Is this yet another example of New Age "junk science"?

A Believe it or not, the Casimir Effect is very real, and it carries with it some profound implications about how we view our universe. In one sense, it confirms the theory that the utter emptiness of a total vacuum is an illusion.

The short description of the Casimir Effect is a small attractive force which acts between two close parallel uncharged conducting plates. It is due to quantum vacuum fluctuations of the electromagnetic field.

The Dutch physicist Hendrick Casimir predicted the effect in 1948. According to the quantum theory, the vacuum contains *virtual particles*, which are in a continuous state of fluctuation. They come into existence out of the vacuum, then immediately annihilate each other. Casimir realized that between two plates, only those virtual photons whose wavelengths fit a whole number of times into the gap should be counted when calculating the vacuum energy. The energy density decreases as the plates are moved closer, which implies there is a small force drawing them together.

Steven Lamoreaux finally measured the tiny force in 1996. His results were in agreement with the theory to within 5%.

Particles other than the photon also contribute a small effect, but only the photon force is measurable. According to the theory the total zero-point energy in the vacuum is infinite when summed over all the possible photon modes. The Casimir effect comes from a difference of energies in which the infinities cancel.

The energy of the vacuum is a puzzle in theories of quantum gravity since it should act gravitationally and produce a large cosmological constant that would cause space-time to curl up! The solution to the inconsistency is expected to be found in a theory of quantum gravity. Everyone will be waiting in anxious anticipation until then.

Q A friend of mine has suggested that I build a helical antenna to listen to the OSCAR satellites that use 435-MHz downlinks. Does this design have any particular advantages?

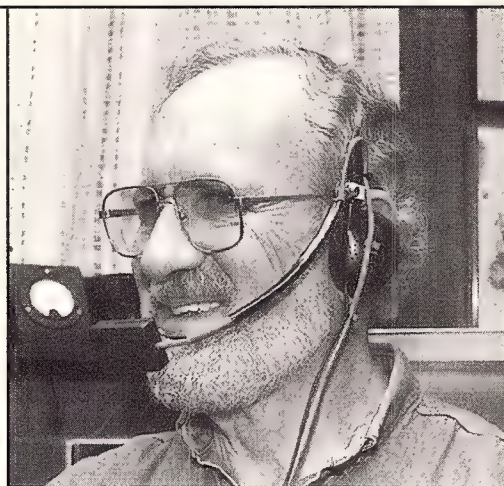
A Yes. A helical antenna is circularly polarized. Circular polarization is simply linear polarization (such as horizontal or vertical) that continually rotates as it travels through space. This works quite well with satellite signals that have highly unpredictable polarities caused by the spinning of the satellite antennas and the effects of Faraday rotation as the signals pass through the ionosphere. In addition, helical antennas offer both broad bandwidth and high gain. When used in a narrow-band application such as what you're considering, they are very forgiving of mechanical inaccuracies. Translation: They're relatively easy to build and adjust! Many hams homebrew their helicals with commonly available copper refrigeration tubing. The results look like copper springs mounted about metal plates or screens. See Chapter 19 of the *ARRL Antenna Book* for more information and construction details.

Do you have a question or a problem? Ask the doctor! Send your questions (no telephone calls, please) to: "The Doctor," ARRL, 225 Main St, Newington, CT 06111.

Q57Z

Build Your Own Microphone Headset

Take a couple of hours this evening and build a high-quality microphone headset!



More and more, many of us are using our computers with our ham radios. Although I don't use mine for packet radio, which is probably the most common application, I do use it for contest logging and for SSTV (slow-scan television). If your situation is similar to mine, you're constantly dealing with the conflict between finding sufficient desk space for your microphone and computer keyboard. They always seem to be in each other's way! I can't type well unless the keyboard is directly in front of me, and I can't actuate the VOX (voice-operated switch) and modulate the transmitter unless I speak directly into the microphone.

What I needed was a headset with a built-in microphone. The advantages are that the keyboard can then be directly in front of me, and—no matter which way I turn my head—I am still speaking directly into the mike. I proceeded to query people on the air to determine which headset was best. Most people I talked to recommended headsets that cost well over \$100. This expenditure seemed redundant since, like many of us, I already had a couple of good sets of headphones. So, I decided to build my own headset, using headphones I already had. Like the commercial units, mine must: (A) be completely adjustable in terms of position, (B) be able to swing up out of the way when just the headphones are being used, (C) be lightweight and comfortable over long periods of operation, and (D) have very high transmit audio quality.

Selecting the Mike Element

I had always enjoyed excellent audio reports with the Yaesu desk mike I used with my Yaesu transceiver. The *element* inside the Yaesu mike (the part of the microphone that actually changes sound into electrical impulses) seemed well tailored for my station and I didn't want to do anything that would reduce the overall quality. That means I couldn't use just any mike element. I ordered a Heil replacement element, the same one used in the top-of-the-line headsets. (Heil elements are stocked by most ham equipment distributors.)

There is a choice of two Heil elements available, the HC-4 and HC-5. The HC-4 was designed for contest and DX operators. It's high-pitched, with a fairly narrow frequency response of 500 to 3800 Hz with a 10-dB peak at 2000 Hz, and a sharp 12-dB-per-octave low-frequency roll off at 500 Hz. This is the element you should select if you want to break through DX pileups. The HC-5 is the element to select for typical rag chewing. It has very clean audio and will provide maximum voice clarity. Its wider frequency response is 350 to 4000 Hz, with a sharp low-frequency roll off under 300 Hz, a high frequency roll off above 3100 Hz, and a peak at 2100 Hz. Although I do a little DX chasing and a few

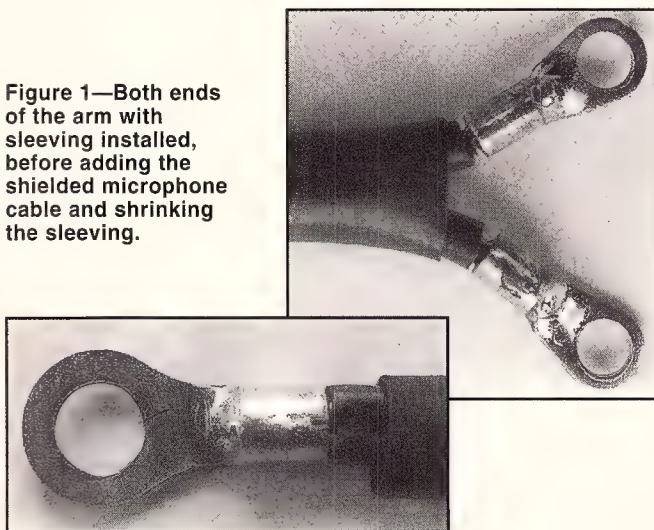
contests each year, I selected the HC-5 because I spend most of my time in ordinary conversation. Later on-the-air comparison tests between my old and new microphones showed that this was a good decision. My friends couldn't tell the difference.

Which Headphones?

My other concern regarded which of my two excellent sets of headphones to select. They couldn't be more different. One was large, well padded, and had individual volume controls on each side. The other was much smaller and lighter weight, and didn't cover the entire ear. For comfort over long periods of operation, I chose the smaller pair. Not covering the entire ear is an advantage, since I like to know what is going on around me. (At least I can hear the telephone ring!)

An "arm" must be fabricated to hold the microphone in the proper position. One end, attached to the earphone, must be capable of pivoting up or down, and it has to be able to remain in position once it is set. The opposite end attaches to the microphone housing where the element resides. The arm must be flexible enough to be bent into the right position for locating the mike in front of your mouth, and, once bent, must stay in that position. To make the arm I used two 7-inch lengths of black insulated #14 solid copper wire. This came from a left-over length of house

Figure 1—Both ends of the arm with sleeving installed, before adding the shielded microphone cable and shrinking the sleeving.



wiring, usually called "Romex." The reason for using two lengths rather than one is so that the arm can mount to the microphone housing at two corners and provide much more rigidity. I stripped and soldered one end of both lengths into a large lug with a 1/4-inch clearance hole. This provides the pivot at the earphone end. Smaller lugs with clearance for No. 6 machine screws are soldered to the other ends, providing the microphone mount. A length of shrink sleeving binds the two copper wires together. Figure 1 shows the ends of the arm, with the lugs and shrink sleeving installed. Don't shrink it until later, after the microphone cable is inserted.

Working with Shrink Sleeving

Shrink sleeving (sometimes called "heat-shrinkable tubing") is wonderful stuff that permanently reduces its diameter when heated. It is very handy for binding cables. The best way to heat it is with careful application of a heat gun, which looks like an industrial strength hair dryer. If you don't own such a device, a lit match carefully run up and down along its length will work fine. Do not hold the match in one place too long or the sleeving will start to melt.

The neatest way that I've found to shrink the tubing is to support the arm on a couple of wood blocks in your oven and simply bake it at 200° F for a few minutes. I used this method, but added the microphone element later so that it would not be exposed to the heat. You should fasten the arm to the plastic microphone housing *after* this step, because the ABS plastic housing will melt. I learned it the hard way, and it meant another trip to the supplier!

Radio Shack stocks a package of assorted diameters of shrink sleeving in 6-inch lengths, which is exactly the correct length for this application. Not only did I use one piece for the arm, but I also used several concentric short lengths to build up the mike cable diameter at the connector end so that the strain relief clamp on the connector could grip the cable securely.

Packaging the Microphone

Next, it was time to package the microphone. I found an ideal plastic enclosure, only 9/16 × 1 3/8 × 2 1/8 inches in size. I carefully drilled two holes about 1/4 inch in from the two corners, using a No. 27 drill bit (0.144 inches in diameter). These are for mounting the arm to the case, using 6-32 hardware as shown in Figure 2. To allow the sound waves of my voice to enter the microphone, I drilled a 3/8-inch hole in the cover of the case just in line with the opening in the element. Finally, a clearance hole was drilled in the end of the case for the microphone cable, which is routed inside the shrink sleeving and can also be seen in Figure 2.

The mike element is not mounted rigidly to the housing, but floats on foam plastic to avoid transmission of vibration, and because the manufacturer suggests a thin piece of foam in front to reduce breath blasts. I glued in a piece of black speaker grill cloth (any coarsely woven fabric will do), and then the foam plastic, to the front cover over the 3/8-inch hole. I glued another thin piece of foam to the rear cover, so that when the cover is closed, the element is sandwiched between the two foam plastic slabs and is securely held in place.

Adding a PTT Switch

I added one additional component, which is optional. Although I usually use VOX operation, I like to have a push-to-talk (PTT) switch available. This is for those rare occasions when your VOX decides not to work properly, which has probably happened to us all. I mounted a miniature normally open momentary contact push-button on the top surface of the mike housing. Adding the button affects microphone cable selection. Without the PTT button, you can use small, flexible single conductor shielded microphone cable. With the addition of the push-button switch, two additional conductors are required, connecting to the proper pins on the mike connector for the PTT circuit. To avoid RF feedback, shielded cable is required. I used four-conductor cable that has both a foil

Figure 2—The inside (below) and the front (right) of the microphone housing.

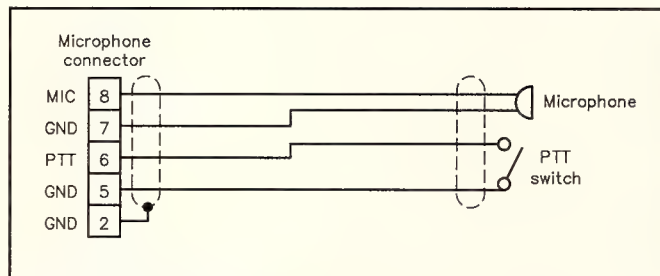
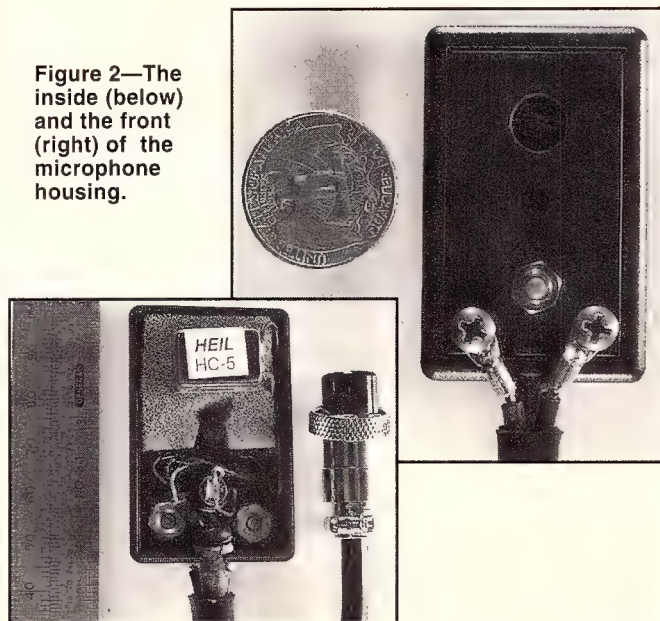


Figure 3—Headset wiring diagram.

Microphone element—Heil HC-5

The following are Radio Shack part numbers:

Microphone housing—270-288

Microphone plug, 8 pin—274-025

Shrink sleeving assortment—278-1627

Push-button switch, momentary contact, normally open—275-1571

and a braid shield. Many modern transceivers use the same 8-pin microphone connector, which is readily available and is shown in Figure 2 and on the parts list.

Figure 3 shows the headset wiring diagram. The pin numbers as shown are correct for my two Yaesu transceivers, but may or may not be correct for yours. Carefully check your transceiver manual before wiring. The cable you select should be as thin and flexible as possible, and about 4 feet in length.

Attaching the Arm to the Headphones

One interesting challenge was mounting the arm to the headphones. After some experimentation, I chose the mounting configuration shown in Figure 4. It is mounted as low as possible on the headset, just above the left earphone. I used a Nylon cable clamp for mounting the arm, and 1/4-inch hardware holds everything together and also acts as a tension adjustment. The lug at the end of the arm is inserted *between* the two sides of the clamp as shown, and screw tension is adjusted so that the Nylon cable clamp acts as a brake and reliably holds it in the selected position, but also allows it to be rotated up and down. As shown in Figure 4,

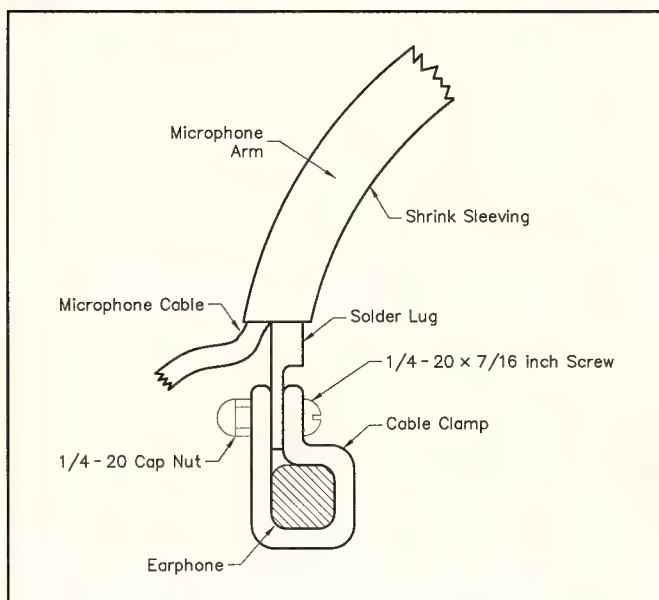


Figure 4—Microphone arm mounting configuration.

everything is held together with a chrome-plated 1/4-inch screw and capnut. You don't have to go to a hardware store, since these items are readily obtainable at any car parts store as license plate mounting hardware.

The microphone and earphone cables are tied together about every 6 inches with small, black plastic wire ties. The connectors neatly plug into my transceiver's microphone socket and earphone jack.

Finished!

For a total expenditure of about \$40, I am very happy with my headset. The comfort and convenience, compared to my old setup, have exceeded my expectations, and I have audio quality equivalent to a much more expensive unit. This project doesn't take long, and you don't have to be a rocket scientist to do it. If you're running out of desk space as I was, this may be the solution to your problems.

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QST

New Books

MORAN OF KATHMANDU

By Donald A. Messerschmidt

Published by White Orchid Press, 98/13 Soi Apha Phirom, Ratchada Rd, Chatuchak, Bangkok 10900, Thailand. Softcover, 5 1/2 x 8 1/2 inches, 314 pages with index, B&W illus, ISBN 974-89271-6-4, \$23 (available from the publisher).

Reviewed by Chuck Hutchinson, K8CH
Membership Services Manager

This book, subtitled *Priest, Educator and Ham Radio Voice of the Himalayas*, is the biography of Father Marshall D. Moran, a Roman Catholic Jesuit priest and a well-known amateur. Life for Moran began in Chicago on May 29, 1906, and ended nearly 86 years later at Holy Family Hospital, New Delhi, India on April 14, 1992. Father Moran invested more than 40 years of his life in Nepal and was widely known among hams as 9N1MM. Between 1960 and 1992, his voice was regularly heard on the 20-meter band where he handed out QSOs to DXers around the world. More than a DXer, Marshall Moran did his share of assisting in medical emergencies in Nepal, evacuations from ships at sea and relief to a storm-stricken expedition in Antarctica. One time, at the request of a Baptist minister, he delivered an Easter Sunday sermon by ham radio to a group in Antarctica.

The ARRL Board of Directors awarded Moran the 1987 ARRL International Humanitarian Award. They praised Moran as one "who, through amateur radio, [is] devoted to promoting the welfare of mankind" and as a man with "an indomitable spirit to learn as well as teach."

Moran became interested in radio as a seventh grader in 1918. He turned that interest into income by constructing receivers that he would sell to neighbors. After deciding to become a Jesuit priest and graduating from college, he set sail for mission service in India.

Twenty years later, in October of 1949, Moran visited Nepal, and just over a year later, the Nepalese government gave its approval for the Jesuits to start a school, which opened the following summer in Godavari (if you want to know about the leopard in the school yard, you'll have to read the book). The school became Moran's final resting place.

As the 1950s ended, Nepal upgraded its communication infrastructure by installing HF links at key points within the country. Amateur frequencies were used for equipment testing, and through that program, the call sign 9N1MM was issued to Father Moran. For the next 32 years, as 9N1MM, Marshall Moran became a ham radio legend.

I had the good fortune to meet Father Moran in 1988 when he visited

ARRL HQ. He remembered me from the few QSOs we had enjoyed, but he was more interested in talking about technology. He was interested in satellites, and was fascinated by a project that I was working on using an MMIC. He may have been a priest, but he had a keen grasp of technology.

For many DXers, Moran was their first contact with Nepal. If you were one of them, you'll surely enjoy reading about the interesting life he led—much of the book is based on taped reminiscences of Moran himself. If you're not, you'll probably enjoy reading about this ham operator who made his mark not only on Amateur Radio, but also upon mankind.

Father Moran Visits

The Connecticut DX Association twice hosted Father Marshall Moran, 9N1MM—in 1984 and again in 1988. During his 1988 visit, my family and I had the pleasure of having Father Moran stay at our home. I'll always remember the year because that year my first son, Ben, was born.

Father Moran talked about his life in Nepal. He told us how he received his Nepalese call sign, 9N1MM, from the king, and how he was able to get on the air. He told of his school and his students, of which he was very proud.

It was still dark the next morning when I heard loud foot steps in the hall. Father Moran wore heavy leather shoes, so I knew it had to be him, so I went to see if he wanted some breakfast. But, once in the hall, I saw that my shack door was closed. "Ah," I thought, "he must want to get on the air!" I knocked at the door and he said, "Come in." To my surprise Father was saying morning Mass at a makeshift altar right in my station! A candle stood atop my power supply, another on my tuner, and the cross of Jesus stood right in the middle. He asked me to join him, and I did, kneeling beside him as he said Mass. What a way to start the day!

Afterwards, he commented, "You should work plenty of DX from your station now."

After breakfast he went on the air from my station. "CQ, CQ, CQ, this is 9N1MM/W1," he called a couple of times. Wow! A hundred stations must have come back to him. I never generated that kind of pileup with my call sign.

Our visit with Father was short but left me lasting memories. We photographed Father Moran in the ham shack holding my infant son. I'll always cherish those. I was very saddened by his passing and will always remember his visit to my home and to my ham shack.—Peter Budnik, KB1HY

QST

SAFEX II: The *Mir* Space Station Repeater

Try this orbiting FM machine!

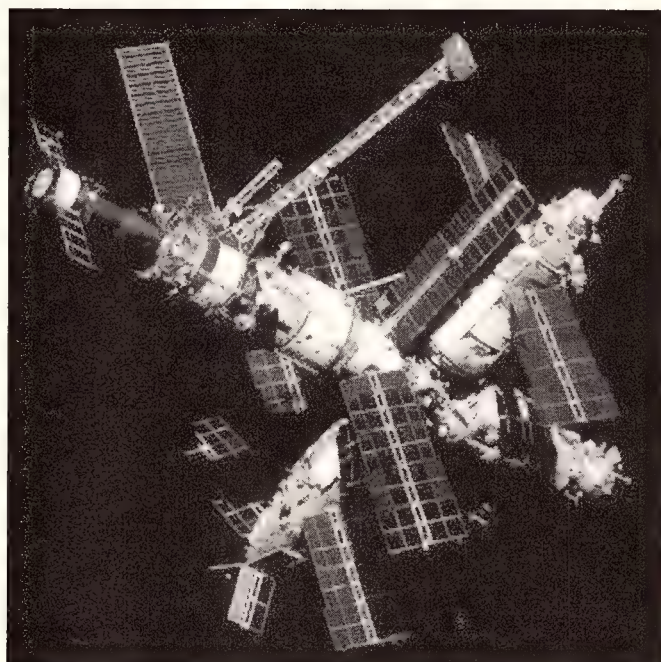
If you read my article in the January 1998 *QST* about AMRAD-OSCAR 27, the FM repeater satellite ("AO-27: An FM Repeater in the Sky," page 64), I hope you've had a chance to try it and get a first-hand taste of satellite excitement! There is another FM repeater in space besides AO-27, though. It's called *SAFEX II* and it is located aboard the Russian *Mir* space station.

Built by German amateurs supported by AMSAT-DL and DARC, the *SAFEX II* repeater has an input (uplink) frequency of 435.750 MHz and an output (downlink) frequency of 437.950 MHz. From *Mir's* orbital altitude of approximately 240 miles, *SAFEX II* can hear stations within a radius of about 1400 miles, compared with 2000 miles for AO-27, which orbits at about 500 miles.

If you've been following the news you know that *Mir* has had more than its share of trouble. They're still working out the bugs in the station's systems, so the operation of *SAFEX II* tends to be unpredictable. By the time you read this, *Mir* will have a new crew consisting of Australian-born US astronaut Andy Thomas, KD5CHF, and two Russian cosmonauts: Talgat Musabayev, RO3FT, and Nikolai Budarin, RV3FB. With an all-ham crew we hope to see more consistent *SAFEX II* operation this year.

So How Do I Work It?

Compared to AO-27, *SAFEX II* is generally easier to hear but



A QSL to Chuck

By Paul Michelsen, KC7QFS

I once shot an elephant in my pajamas! How it got in my pajamas, I'll never know.—Groucho Marx

A while ago I saw a short item on a local AMSAT Web page. It said that Chuck, KI0AG, had worked the *Mir* space station repeater with nothing more than a hand-held FM transceiver and a "rubber duck" antenna. That story gave me all kinds of hope to work the *Mir* repeater with my H-T and my home-brew 70-cm Yagi antenna.

I quickly programmed the memory channels in my Yaesu FT-530 H-T for the *Mir* repeater. I checked my satellite-tracking software and discovered that the best pass for my location here in Salt Lake City would be coming up at 5:41 AM local time with a maximum elevation of 45°. "I wake up at 5:30 every day as it is," I muttered. "I can work this pass and still have time for a donut!"

At the stroke of five, I awoke by myself, but I was dead tired. Knowing that my alarm was still set for 5:30, I went back to sleep. The clock started beeping at 5:30, but I didn't hear it until almost 5:37. I stumbled wearily to the door and let the dogs out. It was now 5:40. I still wasn't dressed when I let the dogs back in. That's when I caught a glimpse of the clock in my shack. It

was 5:43 AM—*Mir* was up, and I was not!

I grabbed my FT-530 and slapped in a new battery. Slipping into my shoes, I bolted out of the house—then immediately bolted back in to grab my truck keys. My 5-element Yagi was on the front seat of my pick-up! As I connected the H-T to the antenna, I heard, "KI0AG" followed by the *kerchunk* of the *Mir* repeater.

Aiming the antenna straight up into the pre-dawn sky, I made my breathless call. "KI0AG, KC7QFS. Hi Chuck. This is Paul!" Nothing. That's when I realized that I had forgotten to choose the right frequency pair to compensate for the Doppler shift. I called Chuck once again and was delighted to hear, "KC7QFS. Good morning! This is KI0AG!"

I walked into the street to get a better view. In the clear November sky I could see *Mir*, a bright star streaking through the star field! I *did it*—I worked the *Mir* space station repeater with just 2 W! I was doing an "end zone" victory dance in the street when I noticed that I was still in my pajamas. Two thoughts flashed through my mind: (1) Are any of my neighbors awake? (2) Did I lock myself out of my house?

Yes, I once worked the Mir space station repeater in my pajamas! How it got in my pajamas, I'll never know.



A *Mir* mission patch worn by the cosmonauts.

more difficult to reach. Depending upon the orientation of the station's antennas, it's often easier to hear because its orbital altitude is lower and its transmitter puts out more power, typically 1.5 W versus 0.5 W from AO-27.

However, because SAFEX II uses a 70-cm input, your uplink signal will be subject to the same Doppler shift of up to plus/minus 10 kHz from center as the downlink. Compare that to only 3.3 kHz of shift for the 2-meter uplink of AO-27. Adding to the problem, SAFEX II's receiver requires frequency accuracy within 2 kHz, while most FM transceivers are capable only of tuning in steps no smaller than 5 kHz.

Unless you own an OSCAR-class station with a multimode transceiver, you may not enjoy uninterrupted, "horizon-to-horizon" access to SAFEX II as you might with AO-27. On the other hand, you can still access the SAFEX II repeater, with interruptions, during much of the time it's available.

SAFEX II requires users to transmit a subaudible tone (CTCSS) of 141.3 Hz, as well as to have signals strong enough to trip the squelch on its input. (As this article went to press, the *Mir* crew had switched off the CTCSS function, but this may be temporary. —Ed.) For reliable access to SAFEX II you'll need about 25 W to a 5-element beam antenna. But don't let this discourage you from trying to reach the repeater with your H-T. It *has* been done! (See the sidebar, "A QSL for Chuck.") I've enjoyed a number of conversations through SAFEX II with the same Yaesu FT-50R hand-held transceiver and half-wavelength whip antenna that I use on AO-27.

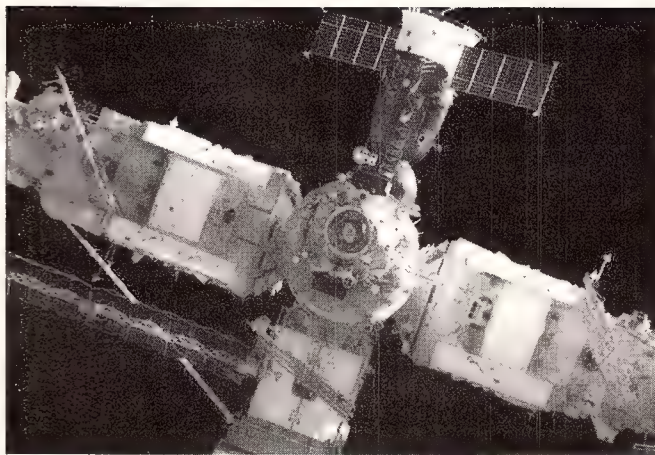
Use Your Memories

Most modern FM transceivers are equipped with memory channels. You can use these channels to help you work the SAFEX II repeater! Just program five adjacent memory channels as follows (and while you're programming, don't forget the CTCSS tone):

Receive (MHz)	Transmit (MHz)
437.960	435.740
437.955	435.745
437.950	435.750
437.945	435.755
437.940	435.760

Begin listening at the highest receive (downlink) frequency and gradually switch from one memory channel to the other, moving down in frequency to keep the downlink signal as loud and clear as possible. Remember to disable your receiver's squelch and, if you're using a hand-held, keep moving your antenna around to follow the azimuth, elevation and polarization of the incoming signal, using your ears as guides. With practice, you'll soon get the hang of it.

How do you know when *Mir* will be available? Satellite-tracking software will provide the answer. AMSAT has a complete



Closing in slowly on *Mir*'s docking port.

library of affordable programs that run on many types of computers. Check out their on-line catalog on the Web at <http://www.amsat.org>. You can also obtain pass predictions for *Mir* and many other satellites directly from the Web at the site maintained by Lou Williams, KE4ARM, at <http://acsprod1.acs.ncsu.edu/scripts/HamRadio/sattrack>.

Voice QSO Mode

In addition to the FM repeater we've been discussing, SAFEX II also has a voice QSO mode through which crewmembers may talk directly with amateurs on the ground. This is an entirely separate system from *Mir*'s voice/packet station that's presently active on two meters, using separate equipment and antennas. SAFEX II even has its own call sign, RRØDL, rather than RØMIR/RØMIR-1.

To use the voice QSO mode, you transmit on 435.725 MHz with a subaudible (CTCSS) tone of 151.4 Hz, and receive on 437.925 MHz. Both frequencies are, of course, subject to the same Doppler shift of up to plus/minus 10 kHz from center as the repeater, so program your radio in a similar fashion to the way you did for the repeater.

When the voice QSO mode is enabled, the repeater is turned off, and vice versa (but when the SAFEX II repeater is on, the 2-meter voice/packet station may be on as well). SAFEX II also has provisions for a third mode, 9600-baud packet, but this is not presently available.

For more about SAFEX II and *Mir*, check the Web at <http://www.geocities.com/~ik1sld/mirex.htm> and <http://www.dx.deis.unibo.it/htdx/mir/mir.html>. Then, if SAFEX is active, fire up your radio today or this weekend and have fun!

60 Waldron Ave
Glen Rock, NJ 07452
e-mail w2rs@amsat.org



CW POETRY?

◊ I'd like to get in touch with anyone familiar with Morse code "rhythm phrases" such as BEST BENT WIRE /5 or others, or any historical background on how these phrases were created. Bruce Frahm, KØBJ, PO Box DX, Colby, KS 67701; e-mail bfrhm@colby.ixks.com.



Test Your Knowledge!

Let us journey to the golden days of yesteryear...

Nostalgia is fine for its own sake, but it really *is* important to understand the history of Amateur Radio, the King of Hobbies. Here are some stops along memory lane that had significant roles in shaping ham radio as we know it today.

1. Before the 6-meter band was created at its current allocation, what nearby band was used by hams for VHF experimentation?
 - a. 5 meters
 - b. 10 meters
 - c. 11 meters
 - d. channel 2
2. The first transatlantic QSO was completed between the US and what European country?
 - a. Spain
 - b. Portugal
 - c. Ireland
 - d. France
3. What explorer took Amateur Radio along on his quest for the North Pole?
 - a. Amundsen
 - b. Livingston
 - c. Perry
 - d. Scott
4. The call sign of the station aboard Thor Heyerdahl's balsa raft, *Kon Tiki*, was...
 - a. VS9K
 - b. OA1TH
 - c. VR6X
 - d. LI2B
5. Incentive licensing resulted in what license class?
 - a. Novice
 - b. General
 - c. Tech Plus
 - d. None of the above
6. Which amateur band was taken to create the Citizen's Radio Service (CB)?
 - a. 6 meters
 - b. 11 meters
 - c. 1.25 meters
 - d. 160 meters
7. The OSCAR-1 satellite was launched in what year?
 - a. 1961
 - b. 1963
 - c. 1965
 - d. 1969
8. Which solar cycle was the most active ever recorded?
 - a. 18
 - b. 19
 - c. 20
 - d. 21

9. Prior to the establishment of the FCC, what government agency granted US amateur licenses?
 - a. US Navy
 - b. Post Office
 - c. Department of Commerce
 - d. Bureau of Standards
10. Phil "Gil" Gildersleeve, long-time *QST* cartoonist, held the call ...
 - a. W1ICP
 - b. W1KM
 - c. W1BB
 - d. W1CJD
11. Who is generally credited with writing the groundbreaking contest-logging program *CT*?
 - a. K1EA
 - b. N6TR
 - c. K8CC
 - d. WJ2O
12. What group developed the first popular packet TNC kit, the TNC-1?
 - a. AMSAT
 - b. QEX
 - c. RSGB
 - d. TAPR
13. Copthorne MacDonald invented what mode of amateur transmission?
 - a. Negative feedback
 - b. Synchronous CW
 - c. Slow-Scan TV
 - d. AMTOR
14. Who was the first ham to transmit from space?
 - a. Owen Garriott
 - b. Dave Garroway
 - c. Ernst Krenkel
 - d. John Huntoon
15. What device allowed hams to easily measure VSWR in coaxial cables?
 - a. Ultimate Transmatch
 - b. Monimatch
 - c. Battle Creek Special
 - d. Rettysnitch

Bonus: The Old Man threatened to use me on poor operators and miscreants. What am I?

22916-107th Ave SW
Vashon, WA 98070

Total Your Score!

There are a total of 15 possible answers in this quiz, not including the bonus question. Give yourself one point for each correct answer.

- 11—15 You have a firm grasp on ham history!
6—10 Your memory isn't quite elephantine, but it will do.
1—5 Too much historical amnesia is a bad thing

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11. a
12. d—The Tucson Amateur Packet Radio group developed the TNC-1.
13. c—"Cop" is considered the father of SSTV.
14. a—Owen, WSLFL, transmitted from the space shuttle in 1983.
15. b—This little bridge was the first coaxial SWR meter for many hams during the mid '50s.
Bonus: The Wouff Hong. The original version of this feared device, created by Hiram Percy Maxim, is kept at ARRL Headquarters today!

7. a—The 100-mW transmitter lasted for nearly two weeks, transmitting "H" in Morse code.
8. b—During the peak of this cycle in 1958, New England amateurs regularly received video and audio signals from BBC Channel 1.
9. c—During World War I, the Navy had authority over all radio, but amateur licensing was transferred to the Department of Commerce after the war.
10. d—Gil drew hundreds of cartoons that captured the spirit of ham radio.

1. a
2. d—The French station was owned by Leon Deloy, 8AB.
3. c—Admiral Perry's contacts back to America were monitored by hams and broadcast listeners alike.
4. d—The Norwegian-flagged raft was equipped with a 5-W station.
5. d—Incentive licensing did not create any new license classes.
6. b

Answers

Edited by Rick Lindquist, N1RL • Senior Assistant Technical Editor

QST Compares: Dual-band Hand-Held Transceivers

By Steve Ford, WB8IMY

QST Managing Editor

The market for hand-held FM transceivers is one of the most competitive in the ham industry. As a result of this competitive pressure, we've seen a bewildering flurry of change during just the last few years. Manufacturers are adding more features while still searching for ways to make them comprehensible to average users. Some H-Ts are exploring the less-is-more strategy while others seem to be auditioning for roles in the new sci-fi thriller, *The Incredible Shrinking Radio*.

The winner, of course, is *you*. Thanks to market forces in action we're blessed with hand-helds that were unimaginable 10 years ago. We're getting a lot more for our dollars, too. Not long ago, a dual-band H-T was considered a luxury. Now they're well within the price range of the average ham. Best of all, modern H-Ts have become multipurpose devices with uses beyond chatting on 2-meter or 70-cm repeaters.



We last looked at dual-band H-Ts in "Product Review" for July 1997, when we compared the Alinco DJ-G5TH, the ICOM IC-T7A, the ICOM IC-W32A, the Standard C508A, and the Yaesu FT-50R. All of these H-Ts still were available from retailers as we went to press. But this is a dynamic market segment, and some of our current crop of four new models already were about to hit the street as we were wrapping up our earlier review (and we have word of even more surprises on the way—stay tuned!) This time, we'll look at the ADI AT-600, the Standard C510A, the Yaesu VX-1R, and the Kenwood TH-G71A dual-band H-Ts. After careful testing and evaluation by the ARRL Laboratory, the radios were turned over to our QST review team for several weeks of "road testing." In addition to myself, our review team consisted of Rick Lindquist, N1RL, Joe Bottiglieri, AA1GW, and Dan Miller, K3UFG.

We found that programming all of these units was relatively simple. Manufacturers have made this process so intuit-

Table 1: Dual-Band Hand-Held Transceiver Features

	ADI AT-600	Kenwood TH-G71A	Standard C510A	Yaesu VX-1R
Extended VHF/UHF reception	Y	Y	Y	Y
Aviation band reception (AM)	Y	Y	Y	Y
Regular memory channels	200 ¹	200	200	194
Memory naming (characters)	Y (6)	Y (6)	N	Y (6)
Memory cloning	Y	N	N	Y
PC programmable	Y ²	Y ²	N	Y ²
Programmed scanning	Y	Y	Y	Y
Power-output choices	H / M / L	H / L / EL	H / L	H / L
Low-battery indicator	Y	Y	N	Y
Lighted buttons	Y	Y	Y	Y
Automatic repeater offset	Y	Y	Y	Y
Crossband split	Y	Y	Y	Y
Full duplex	Y	N	N	N
Paging (code or tone squelch)	Y	Y	Y	Y
Dual watch	Y	Y	Y	Y
DTMF autodialer (memories)	Y (10)	Y (10)	Y (10)	Y (8)
CTCSS tone scan	Y	Y	Y	Y
Antenna connector type	BNC	SMA	SMA	SMA
Suggested retail price	\$390	\$430	\$359	\$349
Typical selling price (as of 2/98) ³	\$267	\$365	\$303	\$277

Key

Y = Standard

O = Optional

N = None or not available

¹120 if using memory-naming feature.

²Using optional software.

³Typical selling prices represent an average of prices quoted by three retailers and do not include rebates, coupons, or other sales incentives.

tive that it has become a routine operation for H-T users nowadays. Some review team members managed to program several memory channels without referring to the book.

Not all H-Ts sound the same on the air. We paid special attention to transmit audio quality on these units and conducted on-the-air tests on simplex to judge how each sounded on the other end of the radio circuit when listening on a typical mobile transceiver. We listened for such qualities as "natural-sounding" audio; low, mid-range, and high-end response; sibilance (over-emphasis of "s" sounds, especially when close-talked); and audio "punch."

In other cases, such a direct head-to-head comparison was impossible, because—as you'll soon see—these H-Ts are tailored to meet the needs of specific user types. Still, we found these radios had much in common, as well as some interesting differences.

ADI AT-600

The ADI AT-600 is styled along the lines of what we might call a "traditional" dual-band H-T. We were pleased to see separate volume and squelch controls for VHF and UHF, plus a separate **CH** (VFO tuning) control. The **VOL** and **SQL** controls are concentric, but adjusting either one is never a problem. In fact, we quickly learned how

to use the sides of our thumbs to rotate the **SQL** "ring." With a little practice, it's a snap. We found that entering frequency changes via the keypad was preferable to twisting the little **CH** knob.

We found that the AT-600 had a very rugged, solid feel. The AT-600 handles well in either palm—maybe favoring lefties just a bit.

The *User's Manual* was quite adequate, but the *Get on the Air Quickly* sheet was very helpful. It has all the information you need to get up and running without flipping pages (everyone's in a hurry these days). We were able to find and execute most basic functions without cracking the manual, so it was kind of like *Cliff's Notes*.

The dot-matrix display on the AT-600 is one of the best we've seen in a while. The letters and numerals are very easy to read at any angle. They are thick and seem to almost glow with a slightly bluish hue. You can display the "main" and "sub" bands simultaneously, or individually. Better yet, you can monitor both bands simultaneously (hence the dual **VOL** and **SQL** controls). However, you can only transmit from the "main" band (VHF or UHF, depending on which you select).

Beyond 2 meters and 70 cm, the AT-600 offers extended receive coverage in several

bands, beginning at 100 MHz. The rig includes an AM detector for aeronautical reception. You can set the radio via the menu to automatically go into AM mode in the aircraft band. At the opposite end of its extended coverage, the AT-600 tops out at 985 MHz (cellular bands excluded).

If you don't want to take advantage of the memory naming feature, the AT-600 offers 200 memory slots (100 for each band). If you use memory naming, you still have 120 memories to label for future reference. The AT-600 lets you apply six-character names to up to 55 memories. In either configuration (this is menu-settable), it's likely more memories than you'll ever want or need.

With the standard 7.2 V battery, the AT-600 is rated at 2 W on VHF and 1.8 W on UHF (ours actually delivered more than 3 W on 2 meters and more than 2 W on 70 cm on a full charge); for another \$25 or so on the street, you can get the optional high-power (HP) package with a taller battery that can deliver 5 W output on VHF or UHF.

Since our manual specified 450 mW of audio output, we expected more sound. Reviewers complained that they'd like to have more. "Seems a bit low for a radio this size," is how one user put it. Some noted distortion at high-volume settings. Our ears weren't fooling us. In the ARRL Lab, we measured

ADI AT-600, serial number 7440000477

Manufacturer's Specifications

Frequency coverage: Receive and transmit, 144-148 MHz, 438-450 MHz.

Power requirements: 6-16 V dc. Receive, 85 mA (dual mode); transmit, (max, high power), 1.5 A with 13.8 V dc.

Size (HWD): 7.6x2.4x1.7; weight, 13.3 oz.

Receiver

FM sensitivity, 12 dB SINAD: VHF, 0.16 μ V; UHF, 0.18 μ V.

AM sensitivity: Not specified.

Two-tone, third-order dynamic range: Not specified.

Adjacent channel rejection: Not specified.

First IF and image rejection: Not specified.

Squelch sensitivity: 0.15 μ V.

S-meter sensitivity: Not specified.

Audio output: 250 mW at 10% THD into 8 Ω .

Transmitter

Power output (H/M/L): with BA072R167, 7.2 V VHF, 2 W / 2 W / 0.35 W; UHF, 1.8 W / 1.8 W / 0.35 W; battery pack, with external supply, VHF, 5 W / 2 W / 0.35 W; UHF, 5 W / 1.8 W / 0.35 W. Spurious signal and harmonic suppression: 60 dB.

Transmit-receive turn-around time (PTT release to 50% of full audio output): Not specified.

Receive-transmit turn-around time ("tx delay"): Not specified.

Measured in the ARRL Lab

Receive, 100-173 MHz, 350-470 MHz, 900-985 MHz; transmit, 144-148 MHz, 430-450 MHz.

Receive, 70 mA; transmit, (max, high power), 1.7A.

Receiver Dynamic Testing

For 12 dB SINAD: VHF, 0.13 μ V; UHF, 0.35 μ V (see text).

120 MHz, 0.2 μ V.

20 kHz offset from 146 MHz, 64 dB*; 10 MHz offset from 146 MHz, 82 dB; 20 kHz offset from 440 MHz, 53 dB*; 10 MHz offset from 440 MHz, 68 dB.

20 kHz offset from 146 MHz, 64 dB; 20 kHz offset from 440 MHz, 53 dB

IF rejection, VHF, 127 dB; UHF, 103 dB; image rejection, VHF, 80 dB; UHF, 44 dB.

At threshold, 0.06 μ V.

S9=2.5 μ V.

228 mW at 10% THD into 8 Ω (see text).

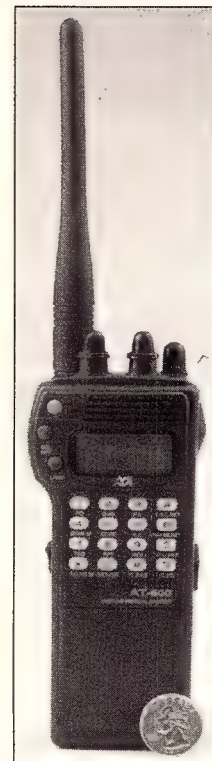
Transmitter Dynamic Testing

VHF, 3.3 W / 2.9 W / 0.4 W; UHF, 2.1 W / 2 W / 0.3 W with BA072R167, 7.2 V battery pack; VHF, 5.6 W / 2.6 W / 0.3 W; UHF, 4.9 W / 2.3 W / 0.3 W at 13.8 V dc (external supply).

VHF, 67 dB; UHF, 70 dB. Meets FCC requirements for spectral purity.

Squelch off, S9 signal, VHF, 130 ms; UHF, 95 ms.

VHF, 28 ms; UHF, 29 ms.



*Measurement was noise-limited at the value indicated.

less than half the specified power. ADI says the specification should have read 250 mW. Our unit didn't even make that, however (see table).

Also, our AT-600 seemed pretty deaf on UHF, and our Lab measurements confirmed this (see table). Our radio apparently was defective. We checked out another unit from a local retailer's and a third supplied by ADI, and both handily met the posted receive sensitivity spec on UHF.

The AT-600 edged out the other units in this group with the best two-tone, third-order dynamic range—64 dB. All were in the same ballpark, however. It also had the best FM sensitivity and adjacent channel rejection numbers on VHF.

We judged the AT-600 to have the most pleasant and natural-sounding transmit audio of this current crop. It was not especially "punchy" audio, but it was very clean at both normal and close-talking range, with no sibilance or popping. "Communication quality plus" is how one reviewer rated it.

We found a few nits to pick with the AT-600. During our transmit audio tests, we noted a very faint whine in the background of undetermined origin. Also, the **PTT** button is combined on the same pad with the **FUNCTION** button. We often found ourselves pressing **FUNCTION** when we wanted **PTT**,

and vice versa. Some reviewers reported that the **PTT** button itself was difficult to press, requiring more force than we've encountered on other radios. Also, reviewers weren't keen on the metal belt clip and predicted it likely would eventually be bent under repeated use.

Overall, we found the AT-600 to be a solid performer in the conventional, full-featured H-T mold.

Manufacturer: Premier Communications, 20277 Valley Blvd, No J, Walnut, CA 91789; tel 909-869-5711; fax 909-869-5710; e-mail premier@adi-radio.com; <http://www.adi-radio.com/>. Manufacturer's suggested retail price, AT-600, \$390; AT-600HP, \$410.

KENWOOD TH-G71A

Modern H-Ts are complicated enough. Squeeze in two bands and a bucketload of features and you have a very complicated radio indeed! In the new TH-G71A, Kenwood has opted to concentrate on the most popular features alone. In doing so, they've created a dual-band H-T that is strong on performance while being quite easy to use.

The TH-G71A offers a total of 200 memories, memory naming, and a versatile group of scanning options. An automatic power-off function and battery saver mode are present as well, but the Kenwood engi-

neers seemed to draw the line at this level of complexity. Instead, they addressed the problems of ease of use and performance. That's where the TH-G71A excels.

With the supplied 9.6 V battery, you get a maximum of 5 W of power on VHF and UHF with the TH-G71A. Even running high power, no one complained that the radio got too hot while transmitting for extended periods. Kenwood says the unit has a "huge" heat sink. It can run up to 6 W on VHF and 5.5 W on UHF with external power.

A low-power version TH-G71AK2, with a commensurately slimmer battery, is the option—around \$30 less on the street. (There's an optional AA cell battery case available too.) Unlike most H-Ts, the TH-G71A includes a long "high performance" rubber duck antenna. This antenna is super flexible and won't jab you in the abdomen if you clip the H-T to your belt. Reviewers liked the molded plastic belt clip, too.

Extended receive coverage (including the aviation band—see table) is standard in the TH-G71A. But, there's not quite as much extended coverage as competing models offer, and this might limit the marketplace appeal of this otherwise superb H-T. Kenwood advises, however, that it will supply information on a strictly do-it-yourself, no-warranty extended receive

Kenwood TH-G71A, serial number 90600838

Manufacturer's Specifications

Frequency coverage: Receive and transmit, 144-148 MHz, 438-450 MHz.

Power requirements: 6-16 V dc. Receive, 70 mA; transmit, (max, high power), 2.1 A with 13.8 V dc.

Size (HWD); 4.4x2.1x1.5 in; weight 11.6 oz.

Receiver

FM sensitivity, 12 dB SINAD: 0.18 μ V.

AM sensitivity: Not specified.

Two-tone, third-order dynamic range: Not specified.

Adjacent channel rejection: Not specified.

First IF and image rejection: Not specified.

Squelch sensitivity: 0.1 μ V.

S-meter sensitivity: Not specified.

Audio output: 500 mW at 10% THD into 8 Ω .

Transmitter

Power output (H/M/L): with PB-39, 9.6 V battery pack, VHF, 5 W / 0.5 W / 0.05 W; UHF, 5 W / 2.2 W / 0.05 W; with external supply, VHF, 6 W / 0.5 W / 0.05 W; UHF, 5.5 W / 0.5 W / 0.05 W.

Spurious signal and harmonic suppression: 60 dB.

Transmit-receive turn-around time (PTT release to 50% of full audio output): Not specified.

Receive-transmit turn-around time ("tx delay"): Not specified. VHF, 84 ms; UHF, 77 ms.

Measured in the ARRL Lab

Receive, 136-174 MHz, 400-470 MHz, 118-136 MHz (AM); transmit, 144-148 MHz, 430-450 MHz.

Receive, 50 mA; transmit (max, high power), 1.7A.

Receiver Dynamic Testing

For 12 dB SINAD: VHF, 0.16 μ V, UHF, 0.16 μ V.

120 MHz, 0.19 μ V.

20 kHz offset from 146 MHz, 62 dB*; 10 MHz offset from 146 MHz, 83 dB; 20 kHz offset from 440 MHz, 58 dB*; 10 MHz offset from 440 MHz, 72 dB.

20 kHz offset from 146 MHz, 61 dB; 20 kHz offset from 440 MHz, 58 dB

IF rejection, VHF, 89 dB; UHF, 141 dB; image rejection, VHF, 125 dB; UHF, 88 dB.

At threshold, VHF, 0.11 μ V; UHF, 0.18 μ V.

S9=1.3 μ V.

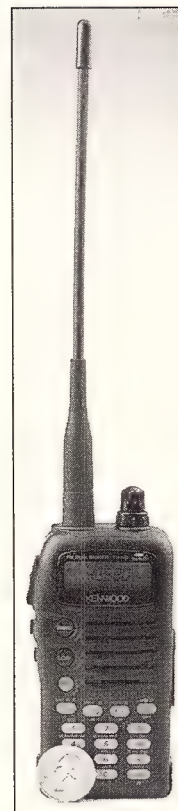
690 mW at 10% THD into 8 Ω .

Transmitter Dynamic Testing

VHF, 5.2 W / 0.8 W / 0.08 W; UHF, 4.1 W / 0.4 W / 0.09 W with PB-39, 9.6 V battery pack; VHF, 5.8 W / 0.8 W / 0.1 W; UHF, 5.2 W / 0.5 W / 0.1 W at 13.8 V dc (external supply).

VHF, 70 dB; UHF, 63 dB. Meets FCC requirements for spectral purity.

Squelch off, S9 signal, VHF, 10 ms; UHF, 25 ms.



*Measurement was noise-limited at the value indicated.

modification for the TH-G71A. With modification, the unit also is capable of receiving 320 to 400 MHz and between 800 and 950 MHz (cellular excluded).

By the way, the unit automatically defaults to AM on its 118 MHz band, although you can manually select either AM or FM reception.

The radio has a very durable feel. In fact, it's quite a handful. The TH-G71A meets MilSpec 810E for water and shock resistance. The ample battery pack attaches to the back of the rig in clamshell fashion, rather than on the bottom like most traditional H-Ts. The tuning control is concentric with the **VOLUME** control, but both seem to operate without too much mechanical interference. (The squelch is set through the menu mode—a growing trend among H-T designs.)

The TH-G71A sports a relatively large speaker for an H-T. Everyone agreed that the receive audio was outstandingly rich and full—the best of the group. On transmit audio tests, we judged the TH-G71A to have great communication quality audio that was fairly natural and neither favors nor rolls off excessively at the top or bottom ends. We detected no undue sibilance, even when close-talked. At normal speaking distances, transmit audio was not remarkably “punchy;” it's just fine. Close-talking gives you a bit of a boost without distortion.

The button and keypad layout are clear and easy to understand. We were pleased to see the power adjustment in the form of a button labeled **LOW**. By pressing this button you can quickly step through the various power output options. This would be very handy in situations where you need to bump your output up or down immediately without fumbling through a menu system.

The display visibility was judged easy to read—with good character size. The icons that indicate various modes or functions were on the small side—typical of similar sized H-Ts. Display backlighting is good, too. The only real display-related complaint was that the display washes out when viewed from below.

By the way, the TH-G71A includes an outstanding manual—arguably the best one among the H-Ts in this review. The instructions are simple without being silly, and the graphics are extremely well done. The manual also provides some nice detail—the remote microphone wiring diagram, for example. Kenwood now packs a laminated *Quick Reference Guide* with the TH-G71A. These also are available from Kenwood dealers.

Also noteworthy: The TH-G71A had the best wideband (10 MHz) dynamic range on both VHF and UHF of the H-Ts in this review group plus the best adjacent channel rejection on UHF.

Overall, this is a great-sounding H-T that incorporates a lot of nice features without going overboard.

Manufacturer: Kenwood Communications Corp, 2201 E Dominguez St, Box 22745, Long beach, CA 90801-5745; tel 310-639-5300; fax 310-631-3913; <http://www.kenwood.net>. Manufacturer's suggested retail price, TH-G71A, \$430; TH-G71AK2 (low-power model), \$410.

STANDARD C510A

Although not quite as tiny as the Yaesu VX-1R, the Standard C510A is a close second. Its stylish, compact design fits just about anywhere—or in any pocket. The C510A is solidly constructed, right down to the buttons. Unlike the rubbery buttons you're accustomed to seeing on other H-Ts, these are tough, clear plastic with labels deeply inset. They seem to almost float on the C510A's front panel.

Like some of the other H-Ts in this review, the C510A avoids the curse of cramming in dozens of features that most operators will never use. Instead, the focus is on simplicity. Still, there are plenty of goodies in the C510A, including 200 memories and auto repeater mode.

As one of our users put it, “The C510A made me a believer in alkalines!” This H-T is designed primarily for use with alkaline batteries. In fact, if you want a NiCd battery

Standard C-510A, serial number 73U120119

Manufacturer's Specifications

Frequency coverage: Receive and transmit, 144-148 MHz, 438-450 MHz.

Power requirements: 3.3-8.4 V dc. Receive, 33 mA; transmit, (max, high power), 0.95 A.

Size (HWD); 4.2x2.3x1.1 in; weight 7.4 oz.

Receiver

FM sensitivity, 12 dB SINAD: VHF, 0.2 μ V; UHF, 0.22 μ V.

AM sensitivity: Not specified.

Two-tone, third-order dynamic range: Not specified.

Adjacent channel rejection: Not specified.

First IF and image rejection: Not specified.

Squelch sensitivity: 0.2 μ V.

S-meter sensitivity: Not specified.

Audio output: 100 mW at 10% THD into 8 Ω .

Transmitter

Power output (H/L): with 3 AA alkalines, VHF and UHF, 1 W / 0.3 W; with external supply, Not specified.

Spurious signal and harmonic suppression: 60 dB.

Transmit-receive turn-around time (PTT release to 50% of full audio output): Not specified.

Receive-transmit turn-around time (“tx delay”): Not specified.

*Measurement was noise-limited at the value indicated.

Measured in the ARRL Lab

Receive, 100-192 MHz, 333-490 MHz, 700-955 MHz (cell blocked); transmit, 144-148 MHz, 438-450 MHz.

Receive, 26 mA; transmit (max, high power), 1.0 A.

Receiver Dynamic Testing

For 12 dB SINAD: VHF, 0.14 μ V; UHF, 0.19 μ V.

120 MHz, 0.18 μ V.

20 kHz offset from 146 MHz, 58 dB; 10 MHz offset from 146 MHz, 69 dB; 20 kHz offset from 440 MHz, 57 dB*; 10 MHz offset from 440 MHz, 67 dB.

20 kHz offset from 146 MHz, 61 dB; 20 kHz offset from 440 MHz, 57 dB.

IF rejection, VHF, 119 dB; UHF, 121 dB; image rejection, VHF, 67 dB; UHF, 79 dB.

At threshold, VHF, 0.22 μ V; UHF, 0.32 μ V.

S9=2.8 μ V.

195 mW at 10% THD into 8 Ω .

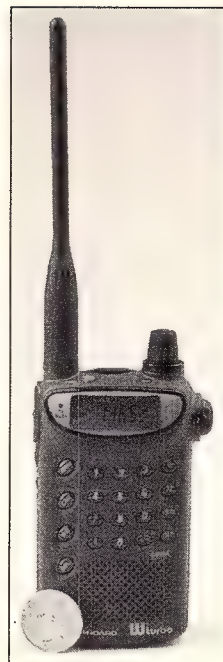
Transmitter Dynamic Testing

VHF, 1.2 W / 0.3 W; UHF, 0.7 W / 0.2 W with 3 AA alkalines; VHF, 1.2 W / 0.3 W; UHF, 0.7 W / 0.2 W at 4.5 V dc (external supply).

VHF and UHF, 70 dB. Meets FCC requirements for spectral purity.

Squelch off, S9 signal, VHF, 80 ms; UHF, 90 ms.

VHF, 76 ms; UHF, 72 ms.



pack you have to buy it as an option. However, we achieved outstanding performance and long operability with alkalines. Powering the C510A with an alkaline battery pack, you can coax a full 1 W from the unit; switching to a NiCd pack will drop you down to 0.7 W (not that a 300 mW deficit will make much difference in the real world). The low-power setting ratchets the C510A down to 300 mW output. When used within the coverage area of a sensitive repeater, the 300 mW output proved to be entirely adequate on either 2 meters or 70 cm.

If H-T power is not enough, however, the C510A can become the first component—essentially a hand-held control head—in a much higher-power mobile station. The optional CPB510DA power booster provides 50 W on VHF and 35 W on UHF, plus more receive audio, and additional receiving pass-band filters.

The display is small, and the lens is rounded, but it's readable from most angles. The only complaint about this arrangement was that the display lens catches a lot of glare when lighted from above (ie, from overhead lighting or even out in the sun). This also applies to the little plastic buttons, which are rounded. Another illumination problem: our users found that while the lamp adequately illuminates the keypad number keys, it does

not provide sufficient backlighting for the various function buttons surrounding the keypad.

The **VOLUME** control is side mounted, so it is easily adjustable with the thumb or index finger, although it might get in your way when you're stuffing this H-T into a pocket. Considering the small speaker size, receive audio on the C510A was fairly clean. We noted some distortion at the highest volume setting. There's not a great deal of audio, but one user had no trouble hearing other stations while using it inside his noisy vehicle.

Transmit audio tests indicated the audio had good "punch" at typical and close speaking distances and sounded fairly natural. We noted a little sibilance and raspiness, especially when the unit was close-talked, but no popping. The audio retains some low end response without being muddy. The desired "communication value" midrange response was excellent.

The tuning control is prominently placed on the top. Squelch settings are controlled through the menu and include an RF-activated squelch (a squelch that activates according to actual S meter readings).

The C510A offers extended receive coverage in different bands between 100 and 999 MHz (cellular blocked). The AM detector can be set to switch in automatically when

you enter the aviation band. With this much spectrum to cover, it helps to have a good scanning system. Fortunately, the C510A delivers with a number of available scanning modes.

While you can't simultaneously listen to two bands, the C510A does permit crossband split operation. The instructions in the *Owner's Manual* are less than clear on this, but you can put frequencies on different bands into one memory channel or the call channel and, for example, transmit via your higher power mobile (FCC rules require you to identify your mobile as a repeater).

Other helpful features include an automatic power-off mode, a battery-saver function, an adjustable time-out timer and a DTMF autodialer.

We worried a bit about the battery cover on the back of the radio. The little clasp is not overly secure and under more vigorous use, this can open up allowing the cover to come off.

Overall, a very compact H-T that covers lots of spectrum and has the right mix of features for its size.

Manufacturer: Standard Amateur Radio Products, Box 48480, Niles, IL 60714; tel 773-763-0081; fax 773-763-3377; <http://www.stdradio.com>. Manufacturer's suggested retail price, \$359.

Yaesu VX-1, serial number 71032574

Manufacturer's Specifications

Frequency coverage: Receive, 0.5-1.7 MHz, 76-999 MHz, (cell blocked); transmit, 144-148 MHz, 430-450 MHz.

Power requirements: 3.2-7 V dc. Receive, 150 mA; transmit, (max, high power), 0.4 A with 3.6 V dc.

Size (HWD); 3.2x1.9x1.0 in; weight 4.4 oz.

Receiver

FM sensitivity, 12 dB SINAD: 76-108 MHz, 1.6 μ V; 144-148 MHz, 0.16 μ V; 170-222 MHz, 15.8 μ V; 300-420 MHz, 0.5 μ V 430-450 MHz, 0.18 μ V; 470-800 MHz, 15.8 μ V (except 540-600 MHz); 800-999 MHz, 5 μ V.

AM sensitivity, 10 dB S/N: 0.5-1.7 MHz, 5 μ V; 108-137 MHz, 0.5 μ V.

Two-tone, third-order dynamic range: Not specified.

Adjacent channel rejection: Not specified.

First IF and image rejection: Not specified.

Squelch sensitivity: Not specified.

S-meter sensitivity: Not specified.

Audio output: 50 mW at 10% THD into 8 Ω .

Transmitter

Power output: with FNB-52LI, 3.6 V battery pack, VHF and UHF, 0.5 W; with external supply, VHF and UHF, 1 W (low power not specified).

Spurious signal and harmonic suppression: 50 dB.

Transmit-receive turn-around time (PTT release to 50% of full audio output): Not specified.

Receive-transmit turn-around time ("tx delay"): Not specified.

*Measurement was noise-limited at the value indicated.

Measured in the ARRL Lab

As specified.

As specified.

Receiver Dynamic Testing

For 12 dB SINAD: 76-108 MHz, 1.7 μ V; 144-148 MHz, 0.18 μ V; 170-222 MHz, 2.2 μ V; 340-420 MHz, 0.5 μ V; 430-450 MHz, 0.18 μ V; 470-800 MHz, 3.2 μ V; 800-999 MHz, 4.5 μ V.

10 dB (S+N)/N: 1.0 MHz, 2.2 μ V; 120 MHz, 0.3 μ V.

20 kHz offset from 146 MHz, 62 dB; 10 MHz offset from 146 MHz, 72 dB; 20 kHz offset from 440 MHz, 49 dB*; 10 MHz offset from 440 MHz, 68 dB.

20 kHz offset from 146 MHz, 62 dB; 20 kHz offset from 440 MHz, 47 dB

IF rejection, VHF, 75 dB; UHF, 138 dB; image rejection, VHF, 70 dB; UHF, 50 dB.

At threshold, VHF, 0.11 μ V; UHF, 0.13 μ V.

S9=3.5 μ V.

61 mW at 10% THD into 8 Ω .

Transmitter Dynamic Testing

VHF, 0.46 W / 0.07 W; UHF, 0.47 W / 0.06 W with FNB-52LI, 3.6 V battery pack; VHF, 1.0 W / 0.12 W; UHF, 1.0 W / 0.14 W at 6 V dc (external supply).

VHF, 65 dB; UHF, 68 dB. Meets FCC requirements for spectral purity.

Squelch off, S9 signal, VHF, 90 ms; UHF, 190 ms.

VHF, 20 ms; UHF, 25 ms.



The OSCAR 27 Test

As a satellite enthusiast, I couldn't resist testing these H-Ts with the AMRAD-OSCAR 27 satellite. AO-27, as it is affectionately known, functions as an orbiting FM repeater. You transmit to the satellite on 145.850 MHz and receive on 436.800 MHz. (See "AO-27: An FM Repeater in the Sky" by Ray Soifer, W2RS, QST, Jan 1998, page 64, for the whole story.)

Of the H-Ts in our review group, only the ADI AT-600 is capable of crossband duplex (transmitting on one band while listening on another), so I wanted to see if I could use it to work through AO-27 using just the supplied "rubber ducky" antenna. For the remaining radios, I simply wanted to see if they could at least pick up the satellite's 500 mW 70-cm signal on their "duckies." For each test I selected a high-elevation pass that brought the bird at least 50° above my local horizon. Oddly enough, I often achieved best results when I held the radios and their antennas *horizontally*. The results were quite interesting.

- **ADI AT-600:** The AT-600 offers crossband duplex, but I never had a chance to test this function with AO-27 since I could barely hear the satellite with the antenna supplied. When the bird was at maximum elevation, I could copy a word or two, but nothing more. There is no point in doing a transmit test if you can't hear the satellite! Just before this review went to press, I conducted another AO-27 test with a new AT-600 and the improvement was dramatic. Obviously our original AT-600 had been defective.

- **Kenwood TH-G71A:** The TH-G71A includes an extra-long rubber ducky antenna, so I expected good performance. I wasn't disappointed. The TH-G71A copied AO-27 with excellent strength during the test pass.

- **Standard C510A:** Something about the design of the C510A and/or its antenna is a bit different. Unlike the other H-Ts, I heard the strongest signals from the satellite when I held the radio *vertically*. Copy was outstanding, lasting for several minutes.

- **Yaesu VX-1R:** Despite the VX-1R's very short antenna, I heard strong, full-quieting signals from AO-27 from horizon to horizon.

This was hardly a scientific comparison. Although I tested each radio at exactly the same location, there are bound to be many variables involved (antenna designs and atmospheric phenomena, for example).—Steve Ford, WB8IMY

YAESU VX-1R

The Yaesu VX-1R, the world's smallest dual-band H-T, generated quite a stir when it was introduced last year at the Dayton Hamvention. The VX-1R isn't a mini, it's a *micro-mini*—about the size of a small pager. The radio not only fits easily in any pocket, you might even lose it in a large one. As one reviewer exclaimed, "This radio beats it all for a fun toy."

With the supplied battery the VX-1R develops 500 mW of output. If you run it from an external 6-V supply, you can get a full 1 W. We found that if you were close to a sensitive repeater or remote receiver, 500 mW was sufficient when using the supplied "rubber ducky" antenna (more efficient after-market antennas—the Comet SMA503, for example—are available for this and other low-power units—Ed). The one-half watt is more than enough power for simplex use while hiking or enjoying other outdoor activities. The VX-1R can transceive on 2 meters or 70 cm, and it can operate crossband split, but you cannot receive both bands simultaneously.

This is the first H-T we've looked at that uses a lithium ion battery, but we're certain to see others. The battery takes less than two hours to fully charge. The 500 mA capacity wall-cube charger is about twice as large as the transceiver itself, but it can be used to operate the transceiver as a dc power source, something many—if not most—H-Ts cannot do.

The LCD display is large and very easy to read. There are a minimal number of buttons and a single multipurpose knob. Controlling the volume is a two-step operation. You press the **VOL** button, then turn the knob clockwise or counterclockwise. It takes three steps to select the desired squelch setting, but these were mild inconveniences given this radio's manifold capabilities.

The VX-1R has astonishing receiver range—the most extensive among the present company of H-Ts. It covers 0.5 to 1.7 and 76 to 999 MHz in nine labeled bands. Yes, you can listen to AM broadcast stations with the VX-1R, although you must connect an external antenna (receiver sensitivity in this part of the spectrum is very respectable at slightly more than 2 μ V). For some odd reason, the VX-1R cannot display the received frequency during AM broadcast reception. You're forced to tune in very relative terms by observing the signal-strength display, but 10 memories are set aside for the BC band. You can also enjoy FM broadcast (it does a surprisingly fine job on this band), aeronautical, public service, and just about everything in between.

Note that receiver sensitivity takes quite a dip in a couple of segments (see table). It's especially deaf around 290 MHz, where we measured sensitivity at a whopping 500 μ V.

For such a tiny radio, it has an adequate display with a bold font that's easy to read. Yaesu also highlighted the + and - symbols for ease of visibility. At some angles, the

display washes out, but, overall, the display was deemed quite acceptable for a radio of this size. Display and button backlighting were judged to be good too. The display lamp can be set to come on automatically whenever you press a button on the VX-1R.

One gripe: the power button can be hard to activate. Sometimes, you needed to apply your fingernail to the rubber button.

The four-connector mike-speaker jack requires using the CT-44 adapter (or similar) to connect conventional headphones or to use the unit on packet. The manual includes connection information, but without an adapter, you can't just plug in an earpiece, to, say, listen while you're waiting at the airport.

It's obvious that the VX-1R was intended for outdoor activities—public service and recreation in particular. For instance, if you press and hold the **A SET/EMG** button for two seconds, the VX-1R goes into its "emergency" mode. It switches to a UHF "home" frequency and begins transmitting an emergency tone. At the same time, it jumps to maximum audio volume and activates a screeching siren! This is a terrific feature for campers, hunters, search and rescue, and the like.

If you and a friend both own VX-1Rs (or similarly equipped Yaesu radios), you can take them on your next hiking trip. With the *Automatic Range Transpond System* (ARTS) activated, your VX-1Rs will "ping" each other at 15-second intervals. If they can hear each other, a beeper sounds (if enabled) and IN RNG ("in range") appears on the respective displays. But if you wander too far from each other, three beeps sound and the display indicates OUTRNG ("out of range"). This would be a good feature to use at busy hamfests, too.

With 194 conventional memories there's more than enough room to store just about every conceivable repeater pair and simplex frequency. Better yet, the VX-1R's *Smart Search* will scan and automatically store active channels in 31 dedicated memories. Plus, you can apply six-character memory names very easily. The VX-1R also includes versatile scanning modes, automatic power off, a transmit timer, and a battery-saving mode. Although the VX-1R lacks a DTMF keypad, Yaesu thought to include an auto-dialer to store and transmit strings of DTMF tones (that you set using the knob). So, you could program one memory to send the autopatch activation code and then another to send, say, your home telephone number.

OK, enough for features. Let's talk about performance. Size (and low power output) have their limitations under the current technology. While the VX-1R hears pretty well, the audio coming out of the tiny little speaker is tinny sounding, and available volume is pretty limited. To be sure, the audio is understandable, if not hi-fi, and that's the point after all. This is not a Bose.

Interestingly, we noted many of the same characteristics while evaluating transmit

audio on simplex. The audio on the other end of the QSO also was understandable most of the time, but it was tinny and not especially natural-sounding. Mid and high-range response predominated at the expense of low-end response and presence. Transmitted audio emphasized sibilants at normal and close-range, and it was slightly raspy sounding at times. We noticed little difference in audio quality when close-talking as opposed

to typical speaking distances.

In customary Yaesu fashion, the VX-1R manual is thorough. It includes handy little user tips from a cutesy H-T-like hominoid called "R. F."

One feature we hadn't before seen on an H-T: the VX-1R lets you adjust the clock oscillator from the menu to shift birdies away from certain frequencies you might want to use.

Overall, the VX-1R offers quite a lot in its teeny package, and it works well. As one tester predicted after using the VX-1R, "Dick Tracy wrist radios are only a bit of battery technology away."

Manufacturer: Yaesu USA, 17210 Edwards Rd, Cerritos, CA 90703; tel 562-404-2700; fax 562-404-1210; <http://www.yaesu.com/>. Manufacturer's suggested retail price, \$349.

MFJ-1026 Deluxe Noise Canceling Signal Enhancer

By Paul Danzer, N111

Assistant Technical Advisor

In the 1950s, sophisticated television viewers in the New York City area had big-time TV reception with five local channels available plus a sixth channel from New Jersey. Late at night, this out-of-state channel featured a gentleman offering the *Veg-a-Matic*—"It cuts, it slices, it chops, it dices for the low price of \$9.95 plus 50 cents for handling." Surprisingly, it did all this, and not badly.

The name of the MFJ-1026 reminds me of the *Veg-a-Matic*. It is *Deluxe*, and contains a number of features and capabilities you may not expect. Just as the *Veg-a-Matic* never replaced a \$500 tungsten-steel chef's knife, this MFJ unit will not replace some other noise cancelers, including DSP-based units. But it works—and it works well—on some types of noise and interference. Finally, it can be configured as a *Signal Enhancer*, and the enhancement is not just due to interference reduction. All in all, this is a very interesting unit.



BOTTOM LINE

The MFJ-1026 is a useful and inexpensive station accessory that can enhance weak-signal reception for hams and SWLs and eliminate interfering signals or noise. Getting the most out of it takes some practice.

What is It?

$1+1=2$, and $1-1=0$. It is that simple. Suppose there was a fixed, unvarying signal. No QSB, no amplitude changes and no phase changes. Take two identical receivers and two identical antennas, combine the receiver outputs with the plus sign and you hear twice the signal. Invert one output and you are now using the minus sign. The result, if both channels are identical, is zero—the signal nulls. You don't want to use two separate receivers? Just put a dual-channel preamp in front of your receiver. Make one channel adjustable so you can change the incoming signal phase by at least 180° , and make the channel gains variable. Use two independent antennas and you can now do the $1+1=2$, and $1-1=0$ trick. This is the essence of the MFJ-1026.

What's in the Box?

In a $7\frac{1}{2} \times 2\frac{1}{2} \times 6$ -inch box, MFJ has packaged two preamplifiers, a phase control, T/R relay and control circuits. The unit is powered by 10 to 15 V dc and draws about 150 mA. The optional MFJ 1312 (12 VDC, 300 mA ac-to-dc adapter) wall cube can be

used. A 2.1-mm coaxial connector (center pin positive) is supplied for the power connection.

The unit is installed between your antenna and your transceiver. Front panel controls pretty much tell the story. The **POWER ON/OFF** controls the DC supply line. The *Instruction Manual* does not say how much power you can run with the MFJ-1026 in line. It has a small relay included for switching from receive to transmit, so 100 W PEP or so is the likely limit. Built-in automatic RF sensing can be used to control the T/R relay, but MFJ suggests hard wiring to the T/R control line connection on the back panel whenever possible. A **T/R DELAY** control on the panel adjusts the relay's recovery time.

The **FREQ** button sets operation for below 7 to 12 MHz or above 7 to 12 MHz. An operating test showed no real difference on the 7 MHz band with either switch setting. In the ARRL Lab, we determined that broadband noise could be nulled between approximately 2 MHz and 35 MHz.

The four controls you will use constantly are the **AUXILIARY ANTENNA GAIN**, **PHASE**, **PHASE NORMAL/INVERT** and **MAIN**

ANTENNA GAIN. Some of these controls operate differently, depending on the setting of internal jumpers. The *Instruction Manual* is pretty clear on the topic of jumper settings.

MAIN ANTENNA GAIN is just that. It sets the receiver gain of the channel connected to the main antenna connector. The other three controls set the phase and gain of the auxiliary channel, with a 180° shift selected by **NORMAL/INVERT**. The **PHASE** control provides an additional shift capability of approximately 145° .

The auxiliary channel can be connected either to a back-panel connector or to the included short vertical whip. A small incandescent bulb inside the unit acts as a fuse of sorts to protect the auxiliary channel when you are transmitting through the main antenna.

What Does it Do?

Used properly, quite a bit! It will cancel noise and interfering signals. But—and it is a big but—the signal you want to cancel must be *unvarying*. As an example, power noise from a pole transformer will most likely be canceled and stay canceled, at least for reasonable periods of time. Ignition noise from a stationary car also will be canceled. If the car is moving, and therefore the amplitude and phase of the noise are changing, you will not be able to cancel the noise. We found in the ARRL Lab that a strong local signal or noise that's at some distance in frequency from the desired signal could be nulled up to around 60 dB.

Similarly, a carrier on a fairly stable path, such a ground wave, will probably stay constant enough for you to adjust the front panel controls and reduce it considerably. But if there is QSB—fading—and the amplitude and phase of the carrier changes, the null set by the front panel controls will no longer cancel the signal reliably.

While the unit's basic frequency range is in the MF/HF spectrum, we determined during ARRL Lab testing that the unit worked for noise suppression down into the Standard Broadcast band, but less effectively as we dropped in frequency.

There's another issue here that involves the usable frequency range. When I first tried to obtain a null on a strong carrier, I failed completely. The carrier was the local

Table 2

MFJ-1026 Noise-Canceling Signal Enhancer

Manufacturer's claimed specifications

Frequency range: Not specified
Power requirement: 150 ma at 10-15 V dc.
Receive-Transmit Turn-Around: Not Specified.
Transmit-Receive Turn-Around: Not specified.

Noise reduction: Up to 60 dB.
Signal Loss from Main Antenna: Not specified.

Tested in the ARRL Lab

Approximately 2 to 35 MHz (see text).
As specified.
0.6 ms (with 100W transmitter power).
5 ms to 1.7 sec (adjustable via T/R
DELAY control on front panel).
As specified (typically at least 30 dB).
Adjustable (via **MAIN ANTENNA GAIN**
control) from a 38 dB loss to a
1 dB gain.

broadcast station, and my first clue that something was wrong was when I could not follow the procedure in the *Instruction Manual*. The **MAIN ANTENNA GAIN** control had no effect. I theorized that the BC station's signal was so strong that it must have been getting into the box via a route other than the antenna port. In order for the null function to work properly, the unit must be able to hear the desired signal primarily on the **MAIN** antenna port and the interfering signal mostly on the **AUXILIARY** antenna port. Type and placement of the actual antennas can make or break your ability to eliminate the desired interference.

By the way, since the nulling has nothing to do with the type of signal you want to hear, the unit will work when you are in any mode—CW, SSB, AM, NBFM or whatever you normally run. But the interference must be from a stationary source and reasonably unvarying in phase and amplitude.

The null function is quite tricky to use—especially at first—but you will get better and better with practice. But don't expect to null a new signal as quickly as you can hit a button to change a receiver filter. It takes work and concentration. Local line noise disappeared in one test on the 15 MHz WWV signal which was much less readable with the unit off-line.

The unit also was able to "move" the null of a signal generated inside the shack so that the signal was stronger on one antenna or the other. The signal source (stationary and unvarying) was physically much closer to one of the antennas, however. This capability lets you steer the pattern away from an interfering signal, although for this to be useful, the desired signal would have to be in another direction from the interference.

This brings us to another capability of the unit that's really interesting. Set the phase so the two signals are additive, and you can now get an effective sort of *diversity* function (*true* diversity reception would require polling). QSB got you down? Try using one input from a dipole and the other from a vertical. I am not equipped with a HF vertical, but my long wire has a good vertical component. Several tests on 20 meters with a multiband Yagi on the main input and the long wire (untuned—just stuck into the auxiliary input) showed considerable improvement in many cases. Unfortunately,

it often brought up the noise level and QRM. The unit does have some gain, and the FET preamplifier appeared to block at a high setting. With two *matched* antennas—as MFJ suggests—you might get some very interesting receiving effects. And it is

certainly much cheaper than two complete receivers plus an external phasing and mixing unit!

And the Answer is...

To eliminate a persistent carrier or noise source, the MFJ-1026 is an approach worth considering. It also can be used to, in effect, set up a "steerable array" of two receiving antennas. The best part, from my operating test, was the diversity mode, where 1+1 was a very interesting 2 or more! MFJ also makes a somewhat less expensive unit, the MFJ-1025, which does not have a preamplifier and the built-in "active antenna."

Manufacturer: MFJ Enterprises Inc, Box 494, Mississippi State, MS 39762, tel 601-323-5869; orders 800-647-1800. Manufacturer's suggested retail price: MFJ-1026, \$139.95; MFJ-1312B ac adapter, \$12.95.

QST

New Products

OMNIDIRECTIONAL VHF ANTENNAS FROM PAR ELECTRONICS

◇ Featuring rugged aluminum alloy, fiberglass and stainless steel construction, these horizontally polarized, omnidirectional antennas for 6, 2, and 1 1/4 meters feature wide operating bandwidths, low wind loads and minimal detuning problems in harsh weather.

The antennas tune up easily without tools, can easily handle up to 160 W of RF, and mount on vertical masts or tower legs up to 1 1/4 inches in diameter. The triangular antennas, designed for mobile/roving, net control and satellite work, are available factory direct or from Amateur Electronic Supply.

Price: OA-50 6-meter triangle, \$63; OA-144 2-meter or OA-222 1 1/4 meter triangle, \$54. For more information, contact Par Electronics at 6869 Bayshore Dr, Lantana, FL 33462; tel 561-586-8278; fax 561-582-1234; e-mail par@magg.net; <http://www.rf-filters.com>.

HF RECEIVER KIT FROM JADE

◇ Designed by N1BYT, Jade's shielded loop receiver kit is built on a 3x5-inch circuit board and comes with a foot-tall indoor loop antenna. The kit receiver goes together quickly and requires only a soldering iron and a few simple hand tools.

The SLR-40 can be configured to cover the entire 30-m band or any 250-kHz portion of the 40-m band. The SLR-80 covers the 80-m ham band. Both units use less than 10 mA and can detect 0.1-microvolt signals. Users supply a 9-V battery and lightweight headphones.

Prices: \$95 plus \$6.50 s/h. For more infor-

mation, contact Jade Products at PO Box 368, East Hampstead, NH 03826; tel 800-JADEPRO; fax 603-329-4499; e-mail jadepro@jadepro.com; <http://www.jadepro.com>.

COOPER'S EZ-MOUNT FOR MOBILE RIGS

◇ With an EZ-Mount from Cooper Manufacturing, mounting hard-to-fit mobile rigs has never been easier—and drilling holes is a thing of the past. Rigs, speakers and other hardware—even keyer paddles—mount to the EZ-Mount's shelf. The weight of the assemblage keeps equipment in place. When you park your vehicle, simply disconnect power and antenna connections and your gear stows easily in the trunk.

The EZ-Mount base is made from high-grade baltic birch plywood and measures 9 inches high by 14 inches deep. Three widths are available: 8, 10 and 12 inches. Mounts are sealed with a blue-gray primer.

Price: \$24.95 plus \$5 s/h. For more information, contact Shack Attack, PO Box 91, Enterprise, UT 84775; tel 800-573-7388, fax 801-878-2100, e-mail kb7vrd@aol.com; <http://www.vcnet.com/sa>.



QST

Hints & Kinks

Edited by **Bob Schetgen, KU7G** • Senior Assistant Technical Editor

ROTATOR CABLE QUICK DISCONNECT

◇ It's getting toward thunderstorm season. Although it's not a major problem up here in VE1 land, some rather strong storms do occur from time to time. Standard operation procedure in such an event is to disconnect all transmission lines and hope for the best. While doing this last year, I noticed that after everything was secured there was still an electrical path into the shack. It's very hard to disconnect eight rotator wires when time is of the essence! My cure was to install a set of automotive trailer hookup splices to my rotator cable inside the shack. (See Figure 1.) When a storm approaches, I just pull the plugs apart and ground the incoming wires.

Shortly after installing the splice, my second-hand rotator needed servicing. As anyone who owns one of these knows, it's not an easy task. To simplify the operation, I added a second set of trailer splices near the rotator. By observing the pin pattern and matching them to the plugs in the shack, you can save a lot of service time. I now can remove the rotator from the tower and unplug the outside splice. Once inside, simply reconnect the outside plugs to the inside ones and you are ready to troubleshoot. I also applied a thin coating of lithium (white) grease to the outside connectors to keep corrosion at a minimum. It's a bit messy but nothing compared to the inside of an average rotator. —*Scott Hale, VE1AFN, PO Box 1203, Westville, NS, Canada B0K 2A0; e-mail shale@north.nsis.com*

A LOW-IMPACT ANTENNA SUPPORT FOR SCHOOL DEMONSTRATIONS

◇ We needed to mount an HF antenna on the (flat) roof of Gowana Middle School. Unfor-

tunately, we were told that there is no structure to which a mast could be secured and nothing to which a dipole element or a guy wire could be attached. The solution, shown in Figure 2, is a noninvasive antenna support system with many other applications.

The mast is a lightweight, telescoping pole made for a swimming-pool skimmer. Different pole lengths are available; ours

has a collapsed length of about 9 feet, and it can be extended to 15 feet. (A second pole can be attached if you need greater height.) The lower part of the mast is secured in through the axis holes of a medium-sized, full cable reel. (Beware of protruding bolts!) Certainly, there are many other ways of fixing the bottom of the mast: one might try using a sand-filled base

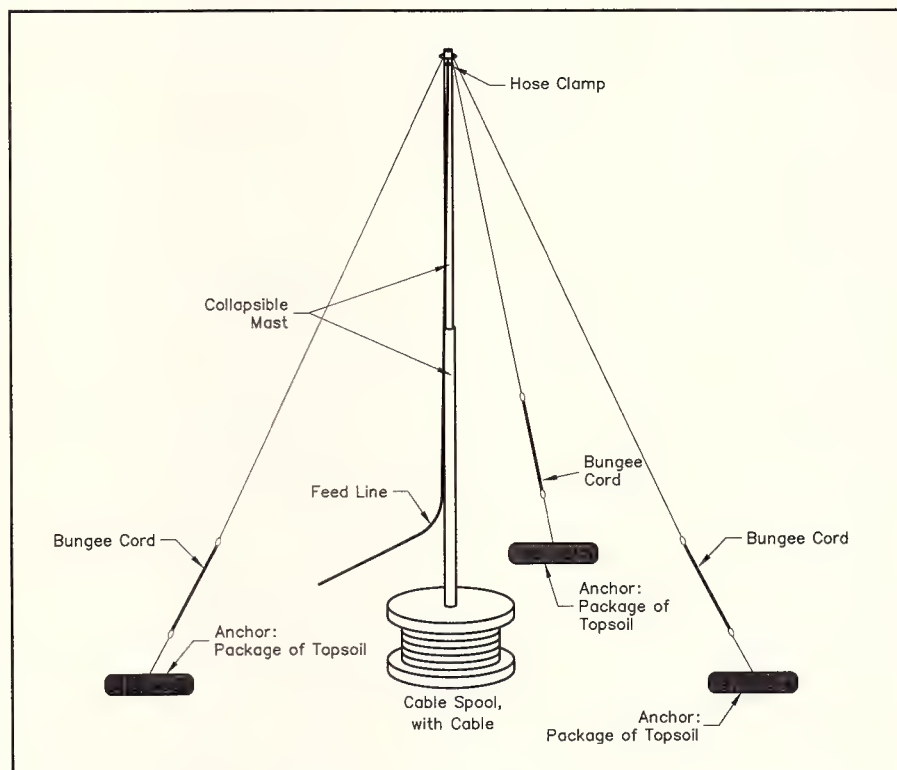


Figure 2—W2XM's antenna setup for school demonstrations.

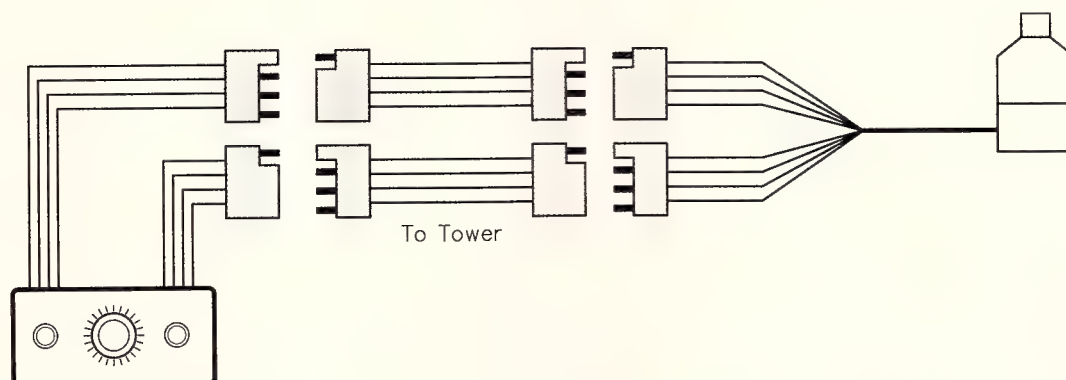


Figure 1—Diagram of VE1AFN's rotator-cable connections.

meant for a picnic-table umbrella.

Three guy wires attach near the top of the pole. A hose clamp keeps the support wires from sliding down the pole. Two of the wires are legs of a 40 meter dipole (configured as a tilted inverted V). So far, the third guy wire is purely structural. In a future operation, I plan to make it a 20 meter sloper antenna.

The lower ends of these three wires must be anchored. I use portable anchors; each is a 25 pound bag of topsoil. (Topsoil is sold in 40 pound bags, which may be too heavy to carry easily to the top of a school. You can make lighter packages to suit yourself and place several bags to anchor each wire.)

Anchor positioning is both easy and non-critical; I use elastic *tie downs* between them and the wires. Set the anchors' final locations so that the horizontal forces from the three wires at the top of the pole cancel each other. This means that the net force on the pole is directly downward and only wind forces can cause tilting of the pole.—*Bob Raffaele, W2XM, 5 Gadsen Ct, Albany, NY 12205; e-mail bobw2xm@tu.albany.ny.us*

Bob's antenna is a great idea for portable, low-impact antenna setups. It's useful for school demonstrations, special-event stations and other locations where there is access to building roofs. (Make sure that you have permission!) Note that the dipole wires carry RF currents that are a shock hazard to any passersby. Make sure that the antenna area is closed to the public during operation. With this in mind, you might also use this setup at ground level in secluded areas where animals and passersby cannot get near the antenna. (Keep the antenna conductors well clear of brush and flammable materials.) The tie downs are a great idea for quick fastening of portable antennas.

We don't have every detail of this antenna, but you can fill them in creatively. Here are some areas for more thought:

Don't use ladder line or twin-lead with this antenna, use only coax.

The coax will pick up RF on the outside of the shield, and that can interfere with SWR measurements. To ensure usable SWR measurements, install a choke balun some distance from the antenna.¹

The antenna conductors should not touch each other (or the pole, if it's a conductor). Insulated conductors can be simply looped under the hose clamp, but make

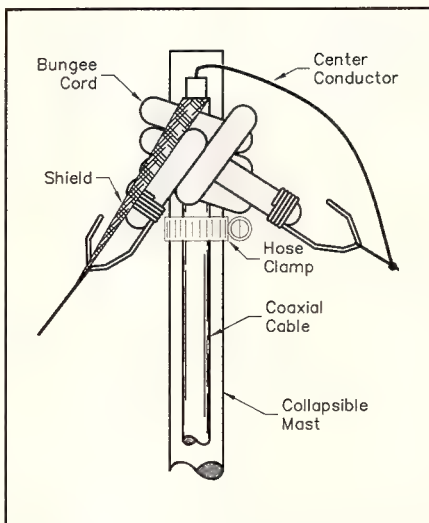


Figure 3—An elastic tie down fastens the antenna wires to the mast.

sure they're protected so that the clamp can't cut through their insulation. This is a good application for W3JIP's center insulators.² Loop a support wire under the hose clamp and through the center insulator's support screw eye, or eliminate the hose clamp and fix the screw eye to the pole with nuts and a bolt. Another solution is to wrap a fourth tie down around the pole and coax, above the hose clamp, and tie it to the pole. Hook each antenna conductor over one of the tie down hooks and attach the feed line to the wires there. (See Figure 3.)

Consider other anchor weights as well. Bags of soil might leak during transport inside the building. Cement blocks would be cleaner. If there are stairs to the roof, consider a small handcart to transport the gear. Once there, flip the cart over—so it doesn't roll—and use it to anchor one wire. (Put more weight on top of the handcart if it's too light.) A gallon jug of water weighs about eight pounds. If a garden hose can reach the roof, you could escape carrying heavy weight by taking up several (three per anchor) empty jugs and filling them on the roof. I'm sure you can imagine many more ways to adapt W2XM's idea.—*Bob Schetgen, KU7G, Hints and Kinks Editor*

NO "CHAIN SAW REQUIRED?"³

◇ I don't intend to be critical but I feel the article doesn't cover all that it should. In particular, I'm surprised to see emphasis on through-glass solutions to the feed line problem because—at least in this part of the country—most houses built since the mid '70s have double-pane insulated glass in their windows. Moreover, the glass is in one big piece, even though applied grids simulate the look of small window panes. This

means that replacing a pane is not feasible.

Instead, I use a piece of 1/8 inch aluminum plate, cut to fit the opening width of my double-hung window. Holes in this plate hold barrel connectors (for coax), a surplus Cannon plug (for the rotor cables) and a ground lug. All station grounds are attached to the plate, which in turn is attached to my main ground, near the ac service entry.⁴ The plate is screwed into the lower sill of the window and caulked around the edges. A slotted piece of foam weatherstrip on its upper edge butts firmly against the bottom edge of the movable window. To seal the upper edge of the movable window—which otherwise is a direct path to the outside air—I use adhesive foam weatherstrip. Stick one piece to the glass of the fixed window at an appropriate place and an overlapping piece to the top of the movable window.

This approach has several advantages over the "stocks" of the earlier article. Most important, it provides a single-point ground bulkhead called for in good engineering practice for lightning protection.⁵ Any lightning suppressors used can be mounted on the plate at the entry point.

Even with no suppressors, a single, convenient entry point encourages the operator to disconnect interior cables whenever the station is not in use. That raises (*slightly—Ed.*) the probability that a strike will not cause catastrophic damage inside the house.

Weather protection is another advantage. Finally, it's as portable as the "stocks," although you need a few more coax connectors and jumpers.—*Pete Smith, N4ZR, Rt 1 Box 459, Kearneysville, WV 25430; e-mail n4zr@ix.netcom.com*

⁴This ground conductor should run *outside* the house, as directly to the ground connection as possible with *no sharp bends*.—*Ed.*

⁵Paul Danzer, N1II, Editor, *The ARRL Handbook* (Newington: ARRL, Order No 1786) pp 9.5-9.7. ARRL publications are available from your local ARRL dealer or directly from the ARRL. Mail orders to Pub Sales Dept, ARRL, 225 Main St, Newington, CT 06111-1494. You can call us toll-free at tel 888-277-5289; fax your order to 860-594-0303; or send e-mail to pubsales@arrrl.org. Check out the full ARRL publications line on the World Wide Web at <http://www.arrrl.org/catalog>.

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QST invites you to share your hints with fellow hams. Send them to "Attn: Hints and Kinks" at ARRL Headquarters (see page 10), or via e-mail to rschetgen@arrrl.org. Please include your name, call sign, complete mailing address, daytime telephone number and e-mail address on all correspondence. Whether praising or criticizing an item, please send the author(s) a copy of your comments.

QST

¹For details, see *The ARRL Antenna Book*, 18th Ed. (Newington: ARRL, 1997, Order No. 6133) pages 6-8 and 6-9. ARRL publications are available from your local ARRL dealer or directly from the ARRL. Mail orders to Pub Sales Dept, ARRL, 225 Main St, Newington, CT 06111-1494. You can call us toll-free at tel 888-277-5289; fax your order to 860-594-0303; or send e-mail to pubsales@arrrl.org. Check out the full ARRL publications line on the World Wide Web at <http://www.arrrl.org/catalog>.

²R. Johns, W3JIP, "Make Antenna Center Insulators from PVC Pipe Caps," *Hints and Kinks*, QST, Feb 1998, p 70.

³Dan Murphy, KA1SZP, "Chain Saw Required?" *QST*, Feb 1996, pp 67-68.

Technical Correspondence

Edited by **Paul Pagel, N1FB** • Associate Technical Editor

SERIOUS HOMEBREWING— GET A MILLING MACHINE

By **Zack Lau, W1VT, ARRL Laboratory Engineer**

◇ One of the skills I picked up while going to school is some basic metalworking experience—I got to use the Bridgeport in the student metal shop. This is a great tool—you can easily mill out full-size rack panels to match your gear. Unfortunately, not only is such a full-size mill expensive, it can be costly to put into your basement or workshop, because of its size and weight.

While reading the rec.crafts.metalworking newsgroup, I noticed that Sherline (<http://www.sherline.com/sherline>) miniature lathes and mills had quite a following. Although they're not cheap, the only people who complained about the machine's quality were those comparing it against full-size equipment, which is like comparing an 18-wheeler against a compact car when it comes to moving household appliances. A Sherline isn't cheap, as you can easily spend a kilobuck if you're not careful, but they're not outrageously expensive, either.¹ Sherline has been making them in San Marcos, California, since 1975, and have added quite a selection of accessories, including a rotary table. Like Ten-Tec, Sherline's service policy is written for people who like to tinker—it's not necessary to put it back together or even find all the parts—before shipping it back to them.

Most people start off with a lathe, but I think a mill is more useful for Amateur Radio purposes. My primary need was to be able to cut slots in aluminum for power transistors. I've also found it useful for making front panels for small transceivers and transverters. Although it's possible to make rectangular holes with a nibbling tool and file, I've never been able to make them look nice—a mill easily cuts precision rectangular holes with nicely rounded corners, and each corner looks exactly like the others.

A Sherline is a very small mill compared to monsters like the Bridgeport—either you are working with a tiny radio, or have carefully figured out how to accommodate the work to the size limitations of the mill. For

instance, you might make coaxial tube sockets out of 4 × 4-inch pieces of metal, instead of trying to make them out of the bottom plate of a 2-meter amplifier cavity.

It is possible to use the mill as a precision drill, but I've not used mine for this purpose. All three axes are controlled by hand wheels: You get 50 mils of travel per turn. Thus, the only way to quickly drill a hole is to put some sort of moveable table on top of the milling table, it makes more sense in most applications to just use a drill press.

To use the mill, you need to get cutting tools that fit in the #1 Morse taper spindle. Some method of attaching your work to the table is also important, since you cannot otherwise get good results with typical milling operations. I bought a flycutter and some collets, a vise and mill tooling plate. Those of you with standard end mills will want to get a 3/8-inch end mill holder. I'm just learning to use my mill. Consult with the factory or a dealer to get the details on what is available to meet your needs.

The flycutter is useful for cutting large flat surfaces, like cleaning up the face of an aluminum plate intended for use as a heat sink. The collets are used to hold small end mills. A vise is probably the most popular way to hold work, but I think the tooling plate works better. The plate is a piece of aluminum that is milled flat and equipped with mounting holes to attach to the mill table. You use it by adding extra holes so you can attach your work with machine screws. By countersinking the bottom of the plate, you can often imitate the final mounting installation. For radio homebrewers, it makes a lot of sense to figure out the mounting techniques up front, instead of trying to add them later. As a bonus, the mounting plate encourages standardization, so you can later make substitutions with less of a hassle.

When using a miniature milling machine, it helps a great deal to select the right materials. Fortunately, these are often the same materials used in building radio gear: aluminum and brass. Soft aluminum can be difficult to mill, so I recommend starting with 6061-T6 aluminum plate, which is an excellent material for building antennas. A Sherline can handle soft aluminum with sharp cutters, Alumtap and good technique.

If you stick with my recommendation and make things out of simple little pieces that combine to make the finished unit, you'll avoid the pressure involved in not messing up the final steps of a complicated

job. Another help is to intelligently choose acceptable tolerances. I find that five-mil accuracy is often good enough for many applications, so I don't have to worry about issues like backlash.

Although it's certainly possible to use a Sherline on a kitchen table, I wouldn't recommend it. Milling results in lots of little metal chips flying around. I wear a full face mask to keep the chips out of my eyes. The unit is light enough to store in a cabinet, and take out when you need it.

Is the cost worth it? When I'm busy homebrewing stuff I find I use it every week, so I wish I'd known about it years ago!

COMMENTS ON THE K9AY TERMINATED LOOP

By **Bill Bridges, W6FA, M/S 136-93, Caltech, Pasadena, CA 91125, e-mail w6fa@cco.caltech.edu**

◇ I enjoyed the article on the crossed terminated loop array by Gary Breed, K9AY,² and I thought others may be interested in the origin of the terminated loop element used in the array. It is none other than H. H. Beverage! Beverage's patent³ on this antenna was issued long after his publication of the much more widely known Beverage Wave Antenna. The loop is definitely *not* a wave antenna, as pointed out in Breed's article and in the Beverage patent. Its operation depends on making the loop diameter "somewhat less than a half the length of the operating wave". The other key difference between the two Beverage antennas is that the wave antenna receives best when the wave travels from the terminated end toward the receiver end, while the terminated loop receives best when the wave travels from the receiver end toward the termination.

Beverage's patent describes the full terminated loop, while Breed's version is essentially half a loop, reflected in the ground. The evolution of one to the other is easily seen: Start with a full circular loop, with the feed line connected across a break in the loop (just as an ordinary small magnetic dipole antenna), and a terminating resistor connected across another break in the circle diametrically opposite the feed

¹The cost of the machines is on par with that of a transceiver. There are some dedicated homebrewers who do excellent work and are willing to invest in such machines. Too, many hams have more than one hobby (photography, astronomy, woodworking, etc) that are often more expensive than hamming. Somehow they find the bucks to do it all.—Ed.

²Gary Breed, K9AY, "The K9AY Terminated Loop—A Compact, Directional Receiving Antenna," *QST*, Sep 1997, pp 43-46.

³Harold H. Beverage, Antenna, US Patent 2,247,743, issued Jul 1, 1941, assigned to Radio Corporation of America.

line. Then, make a cut along this same diameter, keeping half the circle, with the other half being replaced by its image in an ideal ground plane. To allow convenient switching of the feed line and terminating resistor, move them to the center of the semicircle, connecting them to the loop by short wires above the ground plane (feed lines). This is similar to the scheme used to switch directions in rhombic antennas. Breed further tilts these wire feeders to link up with the side support guys. Incidentally, in his patent, Beverage states that the loop can be any shape, giving examples of a circle, a rectangle and a diamond (Breed's version), as long as the dimensions are less than a half wave.

Beverage's patent description of how his antenna works is more confusing (to me) than Breed's description in terms of the superposition of a magnetic dipole ($R_{\text{term}} = 0$) and an electric dipole ($R_{\text{term}} = \text{infinity}$, with arms distorted into a circle). Both terminations result in a roughly figure 8 pattern, but the relative phases of the loops in the 8 are different, so that in the superposition, they tend to cancel in one direction and add in the opposite direction. The relative contributions from the two superposed antennas depends on the value of R_{term} , and can be adjusted for best cancellation. My colleague at Caltech, Dave Rutledge, KN6EK, and I independently came to this same description. Beverage states that R_{term} "may have a value of 700 ohms" for the sample dimensions he gives, employing the usual vagueness that inventors like to adopt in citing actual numbers in patents.

Incidentally, the Beverage patent specifically refers to this invention as a broadband antenna for television reception. In that case, the full loop is oriented horizon-

tally. I find this rather amazing, since the patent was filed in December, 1938! As far as I know, the only "reduction to practice" of Beverage's terminated loop was as a set-top TV antenna by Gibson and Wilson⁴ of RCA (Beverage's patent is assigned to RCA). I don't believe it achieved much success as a rabbit-ears replacement (too expensive), but Paul Gordon, N6LL, assures me that KCBS-TV in Los Angeles uses them on all their mobile vehicles. They are currently available from Tandy Corporation.⁵ Last year, I supervised a Caltech Senior Thesis on an experimental TV version of this antenna with a built-in monolithic chip amplifier.⁶

A feature of the antenna noted by Gibson and Wilson—and one designed into their version—is that the termination giving the deepest null in the cardioid pattern is not a pure resistance, but has a reactive component. I verified this for myself using EZNEC, and also observed that for the $R+jX$ termination giving the deepest null, the feed-point impedance is $R-jX$. I have no explanation for this, but it was true with all the dimensions I used in modeling. In Gary Breed's version, both termination and feed-point impedances will be modified somewhat by the short transmission lines connecting the outer edge of the loop and the terminals. However, anyone building this antenna should experiment with variable reactance as well as variable resistance

to get the best front-to-back ratio.

Breed states that the ground conditions will play an important role in the operation of the antenna, and I certainly agree. A perfectly conducting ground plane under the loop would help a lot. With a simple, short vertical antenna, radial wires do the job nicely, because the near-field return currents are all radial. However, here the situation is more complicated. In this case, the antenna is both a bent-over electric vertical, and a half-loop magnetic dipole. The return currents are definitely not just radial, so that simple radial wires will not properly substitute for an ideal ground plane. I do not know what shape such wires ought to be, but they will be complicated!

One way to get around the ground condition problem would be to use this loop as Beverage originally described, that is, as a horizontal loop. The directional switching might be accomplished by putting four gaps 90° apart in the loop, and running transmission lines from the four gaps to the center of the loop, where switching of the load, the termination and two shorts would electrically rotate the pattern in four directions. I haven't tried this configuration in modeling or in fact yet (I currently live in a condo with a "no antennas" restriction), so someone else can pioneer this version of "Beverage's Other Antenna."

Letters for this column may be sent to Technical Correspondence, ARRL, 225 Main St, Newington, CT 06111, or via e-mail to ppagel@arrl.org. Please include your name, call sign, complete mailing address, daytime telephone number and e-mail address on all correspondence. Whether praising or criticizing a work, please send the author(s) a copy of your comments. The publishers of QST assume no responsibility for statements made herein by correspondents.

QST

New Products

WIZARD 2 PROPAGATION PREDICTION SOFTWARE FROM KANGAROO TABOR

◇ Wizard 2 for Windows, a high-performance skywave analysis tool for hams and professional communicators, uses a fast, 32-bit IONCAP+ engine and offers a variety of improved and enhanced display and analysis options.

Features include hourly reports on "best-band" conditions; a 24-hour report on expected point-to-point path quality; an intelligent Mercator-projection map that's linked to a full-featured DXCC database, a point-and-click map interface, and much more.

Wizard 2 requires Windows 3.x/Windows 95 and a 486 or better CPU. Price: \$49.95 plus \$5 for Priority Mail shipping (add \$2 for non-USA shipping). For more information, contact Kangaroo Tabor Software at Rt 2 Box 106, Farwell, TX 79325; fax 806-225-4006; e-mail ku5s@wtrt.net; <http://www.wtrt.net~ku5s>.

NiMH BATTERIES FROM ADI

◇ In addition to a powerful 1-Ah capacity, ADI's nickel metal hydride (NiMH) battery packs put out 13.2 V under full load, provide a full 5 W output for 90% of the battery's discharge cycle, and never develop "memory" effects.

Two models are available: The RBP-612NMH (for the ADI AT-600) and the RBP-120NMH (for ADI AT-200 and 201 series rigs and many Standard, Relm, Cherokee and Midland radios). Both batteries are compatible with ADI's ARC-12 Smart

Charger and the regular ADI wall charger.

Prices: \$69.95 (120NMH); \$79.95 (612NMH). For more information, contact ADI, 909-869-5711; <http://www.adi-radio.com>.

A 160-METER ANTENNA FOR THE SMALLEST LOTS

◇ Bilal's Isotron 160C 160-meter antenna measures a diminutive 9½ feet tall and mounts on any standard mast. The mini low-bander is fed with 50-Ω coax and can be tuned to your favorite band segment. It does not require ground radials or an extensive ground system.

Rated to 1000 W PEP, Bilal says its 160C has excellent transmitting characteristics and is electrically "quiet" when receiving. Price: \$159.95. For more information, contact Bilal at 137 Manchester Dr, Florissant, CO 80816; tel 719-687-0650.

QST

Mir-School QSOs Resume!

Amateur Radio contacts between the crew aboard the Russian *Mir* space station and schools—on hold since a series of problems plagued *Mir* last year—resumed in February. As this report went to press, one school contact had been successfully completed and three others were on the schedule. The last *Mir*-school contacts were a year ago, when US astronaut Jerry Linenger, KC5HBR, was aboard *Mir*.

On February 23, US Astronaut Andy Thomas, KD5CHF, spoke with six youngsters at Shell Beach Elementary School in Pismo Beach, California. The pupils—in grades 1 through 6—got to ask Thomas 10 questions during the 10-minute contact, which was made possible via a telebridge connection with W5RRR at Johnson Space Center in Texas.

AMSAT Technical Mentor Bill Hillendahl, KH6GJV, from the Santa Rosa Junior College SAREX Telebridge Station W6SRJ, said the children practiced their on-the-air performance several times during the previous week until they had it just right. “After the session with Andy, the kids were very excited and appreciative of all the effort that the SAREX Working Group, their school, and their teachers put forth to make the contact possible,” he said. “A group ‘thank you!’ from the children echoed over the teleconference after contact.”

More than 125 other pupils and adults were on hand at the school during the con-

tact, which was covered by two local TV stations and reporters from two newspapers. The school contact was coordinated by Irene and Frank Wetzel, W6ELK, at the school.

In mid-February, the SAREX Working Group tentatively scheduled Shell Beach Elementary and three other schools for school-to-*Mir* contacts. The other schools on the schedule are in Colorado, Wyoming, and South Carolina. Arranging the contact schedule took several months and had been complicated by the continuing equipment problems aboard *Mir* and—more recently—the change in crews.

Mir now has an all-ham crew aboard. The Australian-born Thomas—the last US astronaut scheduled to serve on the Russian outpost—replaced astronaut David Wolf, KC5VPF, aboard *Mir* in late January. The Australian government has issued Thomas a reciprocal license with the special event call sign VK5MIR for his use while aboard *Mir*. Russian crew members, cosmonauts Talgat Musabayev, RO3FT, and Nikolai Budarin, RV3FB (ex-RV3DB and R4MIR), arrived in late January in the first crew change of the year.

The Shell Beach school contact was a new experience for the pupils on Earth and for Thomas. In the first few weeks of his stay, Thomas logged very little time on the spacecraft’s Amateur Radio equipment because of the crew’s busy schedule. But he did make

some contacts in mid-February on 440 MHz, using the RØMIR call sign. Al Emer, N2YAC, in Holmdel, New Jersey, talked to Thomas for about six minutes on February 17.

“He seemed to be in no rush to get off the air,” Emer said. “He’s a real ham. He likes to talk!” Emer reported good signals on both ends.

Thomas, 46, will work aboard *Mir* until June. He prepared for his four-month tour on duty on the space outpost by taking along several dozen books, cassettes and CDs, and computer programs. Among his selections was Mark Twain’s *Huckleberry Finn*. It had been announced that Thomas would be the last US astronaut to be posted to *Mir*. But NASA and Russian authorities now have left open the door to the possibility that additional US astronauts might serve aboard *Mir* as the International Space Station construction lags behind schedule.

Those delays also might mean a longer life for *Mir*. According to news reports, the 12-year-old space station may stay in orbit a few months longer than planned—until the first components of the International Space Station are in place in 1999. The first ISS units are set to be launched later this year. Hams are scheduled to be among the first crew members to populate the ISS. As ISS construction begins, a transportable ham radio station will go into space that will support voice and 1200-baud packet on 2 meters and 70 cm.

Two Hams Aboard Glenn Flight; SAREX Payload Possible

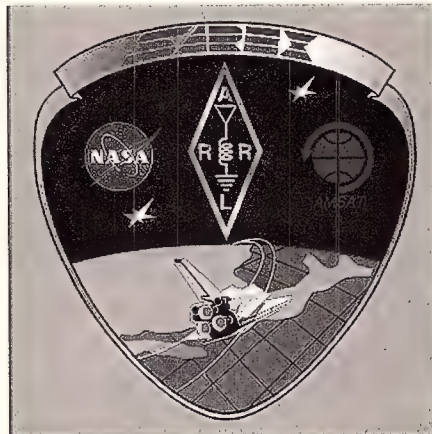
Two hams—Scott Parazynski, KC5RSY, and European Space Agency astronaut Pedro Duque, KC5RGG, of Spain—will be among an international crew this fall when US Senator John Glenn gets his second chance at space travel. The STS-95 mission will mark the third shuttle flight for Parazynski, a medical doctor who trained for a stay aboard *Mir* but had to be reassigned after it was determined he was too tall to fit the Russian space suits worn aboard the *Soyuz*.

It’s still not known at this time if the Shuttle Amateur Radio EXperiment (SAREX) payload will be aboard STS-95, which is scheduled to go up in October. The launch date for the only scheduled SAREX mission, STS-93, has slipped from August to December. The STS-95 flight that will carry the United States’ newest and oldest astronaut into space has been under consideration for several months as a possible SAREX flight. Nothing had been confirmed as of press time, but crew members were looking at possible secondary payloads for the mission. Glenn, who will be 77 when he goes into space again, has been undergoing astronaut training.

Other members of the STS-95 crew include Japanese astronaut and cardiologist Chiaki Mukai, and Americans Steve Lindsey and Steve Robinson. Commanding STS-95 will be shuttle veteran Curt Brown.

While the shuttle will be involved in construction of the International Space Station (ISS), it’s unlikely that SAREX will be aboard shuttle construction missions or shuttle/*Mir* docking flights because of the heavy astronaut workload involved on these missions and the need to swap antennas during *Mir* docking flights. The silver lining here is that the shuttle activity on behalf of the ISS lays the groundwork for a permanent Amateur Radio presence aboard the International Space Station when it is completed and occupied in a few years. But one ISS construction mission that’s expected to be less busy than the others is under consideration to carry SAREX.

Further news regarding future SAREX missions will be posted in *The ARRL Letter* and on the ARRLWeb, <http://www.arrl.org>, as it becomes available.



US TO PARTICIPATE IN CEPT GUEST LICENSE ARRANGEMENT

US amateurs soon will not need to apply for reciprocal licenses in order to operate during short visits to most European countries. While not officially announced as of press time, it's been learned the US request to participate in the European guest license arrangement has been approved. Similarly, most European hams visiting the US no longer will have to submit FCC Form 610A.

Last September, the US State Department applied for US participation in the European Conference of Postal and Telecommunications Administrations (CEPT) Amateur Radio licensing system. A holders of a CEPT license can operate in CEPT-participating countries without having to apply for a reciprocal license.

Approval of the US request came in late January at a meeting of the CEPT Radio Regulatory Working Group (WGRR), in Groningen, The Netherlands. The European Radiocommunications Office (ERO) was instructed to officially notify the FCC of the decision approving US participation.

The State Department's action came at the urging of the ARRL that the US take advantage of the CEPT Recommendation T/R 61-01 arrangements and issue a license that would be recognized by CEPT-participating administrations and would be valid for brief visits.

Also last fall, the FCC proposed amending the Amateur Radio rules to make it easier for hams holding a CEPT license or an International Amateur Radio Permit (IARP) to operate during short visits to the US.

Under the soon-to-be-implemented arrangement, a US Technician license would be recognized as a CEPT Class 2 (VHF-only) license, with full privileges above 30 MHz. Holders of Tech Plus through Extra tickets would be given a CEPT Class 1 license, with full privileges on HF and VHF. Novice licensees would not be eligible for a CEPT equivalent license since most CEPT countries don't offer a license of this type.

Once the ERO formally advises the FCC of the decision, the FCC must complete steps to implement participation before CEPT licensing becomes available to US hams.

ARRL Executive Vice President David Sumner, K1ZZ, said he hopes that will happen quickly. "We've been urging the Commission to do this since 1991," he said. "Now that CEPT has given the green light, we hope the FCC will step on the gas."

PHASE 3D ANGLING FOR "STANDBY" STATUS ON ARIANE 503

Phase 3D Project Leader and AMSAT-DL President Karl Meinzer, DJ4ZC, has "expressed a strong desire" to European Space Agency officials for a Phase 3D launch aboard Ariane 503, which likely will launch late this spring or early summer. Meinzer met January 20 in Paris with ESA officials to discuss including Phase 3D aboard the third test flight of the Ariane 5

launch vehicle.

AMSAT-NA Executive Vice President, Keith Baker, KB1SF, likened the situation to flying standby in order to get a seat on a fully booked airline flight. "That strategy often pays off," he added. Baker said that an international Phase 3D team has "been pressing ahead with getting the satellite flight ready" at the Phase 3D Integration Lab in Orlando, Florida (for additional de-

tails, see "Amateur Satellite Communications" on page 96 of this issue). Phase 3D was reported to be 90% complete as of late February, but Baker conceded that "things are still very fluid" regarding possible launch vehicles and a firm launch schedule for Phase 3D.

AMSAT says the ESA officials "indicated willingness to consider a launch on AR-503," but made no commitments. ESA

BERNARD J. ARTS, WTØN, SK

AMSAT News Service Bulletin Editor Bernard J. "BJ" Arts, WTØN, of Hibbing, Minnesota, died unexpectedly on February 9, 1998. He was 37. Arts reportedly was hospitalized after complaining of flu-like symptoms and died a short time later.

Arts took over the handling of the weekly AMSAT Bulletin a couple of years ago, according to AMSAT-NA President Bill Tynan, W3XO. Tynan was among those expressing shock at Arts' untimely passing. "He certainly was a big help to AMSAT," he said. "He will be missed by all of his friends around the world."

Dan James, NNØDJ, has taken over as AMSAT Bulletin Editor.

Arts was an active VHFer and satellite op. A broadcaster, he had been employed at WDIO-TV in Duluth, Minnesota, and at KSTP-TV in Minneapolis, where he'd won an Emmy Award. He also worked as an announcer on WMFG radio in Hibbing.

BJ Arts was a life member of the ARRL, a member of AMSAT, and president of the Midrange Amateur Radio Club. Survivors include his mother and a sister.

PHILLIP M. CATONA, W2JAV, SK

RTTY pioneer Phil Catona, W2JAV, of Pitman, New Jersey, died suddenly on January 27 after a period of ill health. He was 79. Catona held RTTY WAS #2, for which he qualified in 1961. Based on a design by W2PAT, he also developed the W2JAV RTTY demodulator (see "An Improved Radioteletype Converter," *CQ*, April 1958), which remained a standard for a decade or more in the 1950s and 1960s and was included by Byron Kretzman, W2JTP, in *The New RTTY Handbook*.

Catona also built equipment for and operated on the UHF and microwave bands in the days when they were largely uncharted territory for hams. His close friend, E. M. "Brownie" Brown, W2PAU, recalled how Catona "gave freely of his expertise" to help others with ham radio projects and solve their problems. Catona also belonged to the Antique Wireless Association and collected and meticulously restored vintage radios and radio paraphernalia.

Catona was a member of the ARRL and a member and past president the South Jersey Radio Association. He also was a member of the Cumberland Radio Club and trustee of the CRC club station, W2BX. His wife, Pearl, WA2AVA, is among his survivors.—thanks to Brownie Brown, W2PAU, and Dennis Gazak, N3DG

ERIC EDBERG, W6DU, SK

Noted DXer and contesteer Eric B. Edberg, W6DU, of Los Altos, California, died January 19, 1997. He was 79. First licensed as W2FQW in 1933, he became W6JWD after moving to California in 1950.

Edberg was a long-time ARRL member and DXCC Honor Roll member. He was a past president and secretary of the Northern California DX Foundation, past president and secretary of the Northern California DX Club, a member of the Northern California Contest Club and a member of the First Class CW Operators Club (FOC). In posting word of Edberg's passing on the Internet, Rusty Epps, W6OAT, called Edberg "a wonderful friend whom I and many others will miss greatly." A DXpedition to Palmyra, Kingman and Howland was to be dedicated to the memory of W6DU.—Rusty Epps, W6OAT; Brad Wyatt, K6WR

HENRY RUGG, VA3HN, SK

Veteran Canadian Amateur and ARRL member Henry "Hank" Rugg, VA3HN (ex-VE2HN, VE3JX and VE2JZ), of St Catharines, Ontario, died October 29, 1997. He was 80. Rugg had been a member of the ARRL for 60 years. During World War II, Rugg was among the group of scientists and engineers who worked on a top-secret project to build Canada's radar defenses. He later recalled his wartime experiences in a book, *No Day Long Enough—Canadian Science in World War Two*. In 1992, when he was in his mid-70s, Rugg was part of an expedition to a remote island in the Canadian Arctic. His wife and two sons are among his survivors.—Andrew Rugg, VE2EM/VA3TEE

also agreed to investigate other possible launch opportunities, including Ariane 4 flights. "ESA is making bona-fide efforts to identify a launch for us. I think we stand a good chance," Meinzer said after the January meeting. Another meeting was set for late February.—*AMSAT News Service; Keith Baker, KB1SF*

FCC'S JOHN B. JOHNSTON, W3BE, RETIRES

A well-known FCC personality, John B. Johnston, W3BE, has retired. His last position at the Commission was as Special Assistant for Personal Radio Services to the Public Safety and Private Wireless Division. Johnston's last day at the FCC was January 30.

An electrical engineer, Johnston joined the FCC in 1972 as Chief, Rules and Legal Branch, Amateur and Citizens Radio Division, where he worked under Prose Walker, W4BW. In 1975, Johnston replaced Walker as Chief of the Amateur and Citizens Radio Division. Later, he served as Chief of the Personal Radio Branch, Special Services Division, in the Private Radio Bureau (now the Wireless Telecommunications Bureau).

The retirement of Johnston, who's 70, was not entirely unexpected. For the time being, Bill Cross, W3TN, will handle Amateur Radio matters formerly done by Johnston.

A former ARRL Assistant Atlantic Division Director, Johnston served earlier in his ham radio career as president of the Frankford Radio Club and of the Penn Wireless Association and authored some articles for *QST*, including "Some Notes on Acquiring the Code" in November 1966, and "A New Year's Resolution" in March 1966, for which he won an award from the ARRL Communications Department. He is a Charter Life Member of the ARRL. Johnston was the 1991 Dayton Hamvention Ham of the Year was inducted into the QCWA Hall Of Fame in 1995.

TOWER LAW SUCCESS

Hams in Mason County, Washington, won't be encumbered by a telecommunications ordinance that would have restricted the height of ham radio towers to 70 feet and imposed other stringent requirements. Andrew Forsberg, WV7M, reports that several hams in the largely rural Western Washington county (population approximately 30,000) cited federal preemption over local regulation of Amateur Radio activities as well as the hobby's public service dimension to get the County Board of Commissioners to exclude ham radio from the new law earlier this year.

Forsberg said the drafters of the new ordinance at first seemed unmoved by Amateur Radio considerations. In addition to federal preemption, the county hams pointed out the connection between a good antenna system and ham radio's public service contributions—in an area subject to

FCC SEQUENTIAL CALL SIGN UPDATE

The following is a list of FCC sequentially assigned call signs issued as of February 2, 1998.

District	Group A Extra	Group B Advanced	Group C Tech/Gen	Group D Novice
0	AB0HF	KI0LO	++	KC0CRE
1	AA1TE	KE1JE	++	KB1CIT
2	AB2EX	KG2NO	++	KC2CYG
3	AA3QT	KF3AW	++	KB3CBT
4	AF4HV	KU4OF	++	KF4VRS
5	AC5OX	KM5OU	++	KD5DFM
6	AD6EJ	KQ6UM	++	KF6PIL
7	AB7XF	KK7LT	++	KD7AKT
8	AB8BV	KI8FA	++	KC8JFJ
9	AA9VK	KG9MI	++	KB9SAO
N Mariana Island	NH0B	AH0AY	KH0GV	WH0ABI
Guam	++	AH2DF	KH2TA	WH2ANV
Hawaii	NH7F	AH6PF	KH7IN	WH6DEN
American Samoa	AH8P	AH8AH	KH8DL	WH8ABF
Alaska	AL0H	AL7QY	KL0LN	WL7CUQ
Virgin Islands	++	KP2CM	NP2JX	WP2AIJ
Puerto Rico	NP3S	KP3BE	NP3TS	WP4NNP

++All call signs in this group have been issued in this district.

floods, earthquakes, power outages during winter storms, and even volcanic activity). Commissioners then "began to soften their position," Forsberg said.

"By the time the vote was taken, the commissioners were well-informed of our position and were commending Amateur Radio for its outstanding contributions to the community," he said.

SECTION MANAGERS ELECTED

Virginia, Pacific, and San Diego will get new section managers, while incumbent section managers were returned to office in five other sections.

In the Virginia Section, Lynn Gahagan, AF4CD, of Chesapeake outpolled Lawrence Macionski, W8LM, of Bluemont 1256 to 579. Gahagan will succeed current Section Manager Chris Wright, KD4TZN, of Rocky Mount, who did not seek another term.

In the Eastern Pennsylvania Section, incumbent SM Allen Breiner, W3TI, of Tamaqua defeated Robert Stanhope, KB3YS, of York 950 to 760.

In the North Carolina Section, incumbent W. Reed Whitten, AB4W, of Cary was the winner in a three-way race. Whitten received 730 votes. Challengers Glenn Roger Allen, KD4MYE, of Wake Forest and Billy Mitchell, WB4SGA, of Mebane, polled 657 and 636 votes respectively.

Votes from the three contested sections were counted February 24 at ARRL Headquarters.

Candidates in five other sections were uncontested. Declared elected were: In the Eastern New York Section, incumbent Rob Leiden, KR2L, of Scotia; in the Louisiana Section, incumbent Lionel "Al" Oubre, K5DPG, of New Iberia; in the Pacific Section, Ronald Phillips, AH6HN, of Keaau, Hawaii (Phillips will succeed current Pacific SM Dean Manley, KH6B); in the San Diego Section, Tuck Miller, K6ZEC, of

National City (Miller will succeed Patrick Bunsold, WA6MHZ); and in the South Dakota Section, incumbent Roland Cory, W0YMB, of Mobridge.

Terms for successful candidates begin April 1, 1998.

HAMS WEATHER WEST COAST RAINS, ICE

During early February, Amateur Radio was active in the San Francisco area, assisting emergency officials in coping with the disastrous effects of heavy rains. ARRL San Francisco Section Manager John Wallack, W6TLK, said that floods and mudslides closed many roads and isolated smaller communities, especially along the coast. The situation put hundreds of homes along the Russian River in Sonoma County at risk of being destroyed in mudslides.

Hams were stationed in the affected areas at shelters and EOCs since the disaster started on February 3. Hams also were active in Mendocino, Lake, Humboldt and Marin counties hams, supporting emergency activities. Wallack says he worked at the Sonoma County EOC February 6 and 7 and got a first hand look at how ham radio was able to respond during the emergency. "Amateur Radio has again proved to be a valuable resource," he said.

Further up the coast, hams in Oregon were called into action in mid-January when an ice storm knocked out power and telephone service, putting much of the Portland area into a bind. ARES members were called in to help handle communication tasks for local emergency agencies.

Ironically, Kevin Hunt, WA7VTD, John Williams, WB7SJK, and Billy Toman, N7WXD, formed the Oregon City Amateur Radio Emergency Service Club just a week before the ice storm hit. Williams says the club has nearly 30 members.

The hams' ice storm activities garnered

great publicity for the hobby in an article in the January 23, 1998, edition of the *Oregonian* newspaper. The article quotes Oregon City Fire Chief Jim Davis as a strong advocate for ARES. It also mentions other past emergencies in the Northwest where hams were able to provide a helping hand.

CUSHCRAFT CONTINUES IN HAM MARKET; HIRES NEW VEEP

Cushcraft says reports of its demise in the ham radio market have been greatly exaggerated. According to Cushcraft Pro-

duction Manager Art Hambleton, K1ART, the New Hampshire antenna manufacturer is still very much a part of the Amateur Radio antenna industry. Rumors that Cushcraft was exiting the ham market apparently mushroomed when word spread of some layoffs at Cushcraft.

Hambleton confirmed that a couple of people had been let go and that Cushcraft had cut back on its advertising in ham radio publications. He attributed the moves to budgetary cutbacks, but added that 1997 was not a bad year for the company, and Cushcraft has hired another ham in a key position.

Hambleton announced in February that Cushcraft has hired Adam Alevy, N1FXT, as its vice president of engineering. Alevy, 34, previously designed VHF through millimeter wave antennas for Atlantic Microwave.

As director of engineering at Cushcraft, Alevy, will manage the engineering group and design both amateur and commercial products.

In Brief

• **New award fees in effect:** New fees went into effect the first of the year for VUCC certificates and for WAS, Rag Chewers Club, Old Timers Club, Friendship, and WAC awards. An initial, replacement, or additional VUCC certificate now costs \$10. Pins are \$5. An initial WAS certificate costs \$5 plus return postage for your QSLs. WAS endorsements will be \$3 plus return postage. The 5BWAS certificate will be \$10 (includes pin) plus return postage, while the plaque will cost \$30 plus shipping. The RCC and OTC awards will be \$3 each while the Friendship Award will cost \$5 (no charge for these awards from ARRL-affiliated clubs). The WAC and 5BWAC awards will be \$3 for US applicants plus return postage for QSLs.

• **KA1T steps down as New England Vice Director:** Don Haney, KA1T, formerly of Harvard, Massachusetts, has resigned as ARRL New England Division Vice Director, effective February 15. Haney has moved to Wisconsin and is no longer eligible to serve. Haney, 58, was appointed as Vice Director in July 1996 and later was elected in his own right to the 1997-1998 term. No one has been named yet to fill the vacancy.

• **50 years for W6OWP practice sessions!** Fifty years ago, Bart, W6OWP, began the West Coast code practice and qualifying runs. The first official announcement appeared in the June 1948 edition of *QST*. Congratulations, Bart, and thanks!

• **Farewell!** ARRL Assistant Technical Editor Paul Danzer, N1II, departed the HQ staff January 15 for a community college teaching position. During his tenure on the Book Team, he served as editor of *The ARRL Operating Manual* and *The ARRL Handbook*, among other publications. We wish him well in his new endeavors.

• **Outgoing QSL Service stats:** Propagation must be looking up. The ARRL Outgoing QSL Service handled 1,378,240 QSL cards to DX stations during 1997—that's 9,200 pounds, or more than 4½ tons, of cards. The number represents an increase from 1996 of more than 78,000 cards handled.

• **ARRL Audio News OK for repeater nets:** *ARRL Audio News* is available from the ARRLWeb in *RealAudio* format or by telephone at 860-594-0384. We encourage the use of *ARRL Audio News*—in whole or in part—on local repeater nets. You don't need any special permission to use it, but please identify it as *ARRL Audio News*.

• **Raft carrying ham radio lost:** Word arrived from South Korea in late January that all hands aboard a research raft carrying ham radio station HLØJQT/mm were lost in heavy seas off the coast of Japan. Japanese Maritime Safety Agency authorities had responded to a distress call that the crew was extremely exhausted. It's not clear if the distress call went out on Amateur Radio frequencies. Bodies of three of the crew members were recovered, but a fourth was missing. The 23-foot research raft, which had a sail but no engine, was attempting a voyage from Vladivostok, Russia, to Pusan, South Korea, when it capsized in stormy seas. News reports from South Korea said the four-man crew, led by 48-year-old skipper Lee Duk-young, was attempting to retrace the sea route linking Palhae, an ancient Korean dynasty that originated in northeast China, to the Korean Peninsula.—*Vernon Eubanks, KØLVS/HL9VE*

• **LF band sought Down Under:** A Wireless Institute of Australia-Australian Communications Agency liaison team plans to submit a new proposal for a ham band in the low-frequency spectrum below 200 kHz. The move follows the European allocation of 135.7-137.8 kHz by the CEPT. General class hams in New Zealand have been allowed to use 165 to 190 kHz on a non-interference basis since 1990. Australian hams have had to get special permission to operate there. Contacts over distances of more than 150 miles have been made between ZL hams and experimental licensees in VK.—*QNews*

SECTION MANAGER ELECTION NOTICE

To all ARRL members in the Connecticut, Idaho, Minnesota, North Dakota, Ohio, Oklahoma, Southern Florida, Western New York, Puerto Rico, and Virgin Islands sections. You are hereby solicited for nominating petitions pursuant to an election for section manager (SM). Incumbents are listed on page 12 of this issue.

To be valid, a petition must contain the signatures of five or more full ARRL members residing in the section concerned. Photocopied signatures are *not* acceptable. No petition is valid without at least five signatures, and it is advisable to have a few more than five signatures on each petition. Petition forms (FSD-129) are available on request from ARRL Headquarters but are not required. We suggest the following format: (Place and Date)

Field Services Manager, ARRL
225 Main St
Newington, CT 06111

We, the undersigned full members of the _____ ARRL section of the _____ division, hereby nominate _____ as candidate for Section Manager for this section for the next two-year term of office.

(Signature _____ Call Sign _____ City _____ ZIP _____)

Any candidate for the office of Section Manager must be a resident of the section, a licensed amateur of Technician class or higher and a full member of the League for a continuous term of at least two years immediately preceding receipt of a petition for nomination. Petitions must be received at Headquarters by 4 PM Eastern Time on June 5, 1998. Whenever more than one member is nominated in a single section, ballots will be mailed from Headquarters on or before July 1, 1998, to full members of record as of June 5, 1998, which is the closing date for nominations. Returns will be counted August 18, 1998. Section managers elected as a result of the above procedure will take office October 1, 1998.

If only one valid petition is received from a section, that nominee shall be declared elected without opposition for a two-year term beginning October 1, 1998. If *no* petitions are received from a section by the specified closing date, such section will be resolicited in the October 1998 *QST*. A section manager elected through the resolicitation will serve a term of 18 months. Vacancies in any section manager's office between elections are filled by the Field Services Manager. You are urged to take the initiative and file a nomination petition immediately.—*Richard K. Palm, K1CE, Field Services Manager*

QST

Edited by **Bill Kenamer, K5FUV** • DXCC Manager

DXCC 2000: New Rules for the Next Century

By **Chuck Hutchinson, K8CH**, and
Bill Kenamer, K5FUV

The DXCC 2000 ad hoc committee has finished its work, delivered a final report to the ARRL Board of Directors, and gone out of existence. The Board received the report at its January meeting and approved new rules for DXCC that will go into effect March 31, 1998. You can find those rules on the ARRL Web site at <http://www.arrl.org/awards/dxcc/#rules>.

The DXCC2000 Committee was created at the January 1996 Board of Directors meeting from a motion by Director John Kanode, N4MM, of the Roanoke Division. The committee had a rather broad mandate: to encourage broader participation, make the program more equitable, create better-understood criteria, improve the add and delete process, and increase administrative efficiency. The committee looked at all aspects of the DXCC program. Ideas were bounced around, many of which were immediately eliminated, some which took greater study, and some of which were eventually adopted.

We also looked at member input taken from a survey placed in *QST*. This told us that changes didn't need to be major, but subtle.

Finally, by the time the deadline for discussions had been reached, the final rules evolved, along with some future implementation plans.

Criteria for Inclusion

The biggest change in the rules is in the criteria for inclusion on the DXCC List. This change was discussed more fully in last month's column. What we used to call "Point 1 — countries by reason of Government," are now called "Political Entities." (The DXCC List refers to its entries as "entities," not "countries." In reality, that's what they have always been.) Many of us remember debates about how much sovereignty is enough. Those debates were often difficult and sometimes contentious. Now one only has to look at three listings (all

appear on the World Wide Web). If the Entity appears on any one of the three, it qualifies for addition to the list, and will be added administratively. The criteria require one of the following: The Entity is a UN Member State; The Entity has been assigned a call sign prefix bloc by the ITU; The Entity has a separate IARU Member Society. Another important point is that only a Political Entity can be a "parent" of a Geographical Entity.

The rules for separation are changed with respect to measurements, which are now given in kilometers. In the conversion



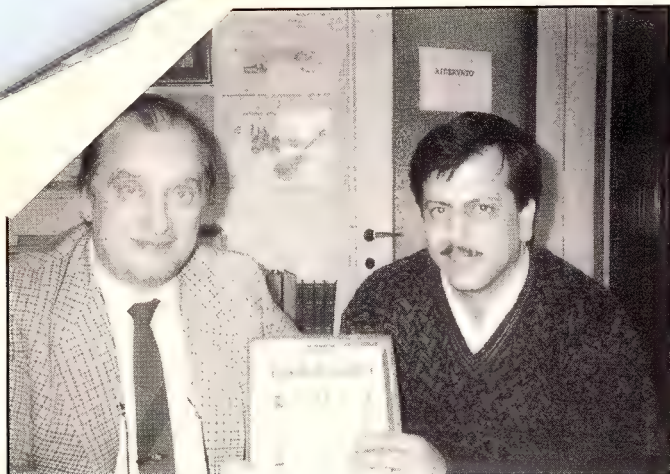
Gerry Shirk, S92AT (left), and Francisco Costa, CT1EAT/ S91FC, operated S97A in the CQ WW SSB Contest last fall.



Gerry attacks the contest pileups from S97A.



Francisco, CT1EAT/S91FC, operates from his location in Sao Tome.



Mario Ambrosi, I2MQP, Vice President of Associazione Radioamatori Italiani, and Hamid Rahimi, EP3HR, meet in the offices of ARI in Milan. Mario is now Hamid's QSL manager.



Franz Langner, DJ9ZB, and Baldur Drobica, DJ6SI, were active as 3XA8DX in December.

process the distances have become slightly less. Separation by land was 75 miles and is now 100 kilometers (62.15 mi.). For islands the 225 mi. becomes 350 km (217.53 mi.), and 500 mi. becomes 800 km (497.20 mi.). In addition the minimum size for islands to be considered changes from an area of 10,000 square feet to a linear (straight-line) measurement of 100 meters.

You'll need to look in the beginning of SECTION II of the rules under Definitions to find the new island rule which states: "Island: A naturally formed area of land surrounded by water, the surface of which is above water at high tide. For the purposes of this award, it must consist of connected land, of which at least two surface points must be separated from each other by not less than 100 meters measured in a straight line from point to point. All of the connected land must be above the high tide mark, as demonstrated on a chart of sufficient scale. For the purposes of this award, any island, reef, or rocks of less than this size shall not be considered in the application of the water separation criteria described in Part 2 of the criteria." This change, and all the other changes in criteria were made to make the rules easier to understand and more objective. It also eliminates the "phantom reefs" that would often eliminate a legitimate candidate from consideration. In one case from the past, a potential "new one" was eliminated because of the presence on the map of a reef that was later found on an accurate sailing chart to actually be underwater!

There are four special areas in the rules: 4U1ITU, which is the call sign of the International Amateur Radio Club located at the headquarters of the International Telecommunication Union in Geneva, will be considered a Special Entity. The ITU governs telecommunications world wide, and assigns all valid international radio call sign allocation blocks. It

was felt that the mission of the ITU is important enough to Amateur Radio to merit special consideration. It should be noted that "no additional UN locations will be considered under this ruling." 4U1UN remains on the list only because of its inclusion in the 1997 DXCC List.

The Antarctic Treaty area (which lies below 60 degrees South latitude). This area is, by treaty, international territory, where territorial claims are neither recognized nor denied: Owing to those provisions of the Antarctic Treaty, "no new Entities below 60 degrees South will be added to the DXCC List as long as the Treaty remains in force." You might say this freezes the status quo in the South Polar Region.

The Spratly Islands, while a significant geographical entity, is disputed by several claimants. Without attempting to recognize any of those separate claims, it can remain on the DXCC List until such time as those claims may be sorted out. Also for that reason, "Operations from this area will be accepted with the necessary permissions issued by an occupying Entity. Operations without such permissions, such as with a self-assigned (e.g., 1S) call sign, will not be recognized for DXCC credit." There's a three star hotel out there now, so this should be less of a problem area in the future.

In Western Sahara, a cease-fire is being enforced by UN peacekeepers, while plans are being made for a national referendum to be carried out, possibly as soon as this spring. After the referendum, a final determination of the disposition of Western Sahara will be made. While it remains on the DXCC List, only operations licensed by the RASD will count for Western Sahara, SØ.

The final entry in this section states: "Entities on the 1997 DXCC List remain as long as they retain the status under which they were originally added. A change in that status will result in a review in accor-

dance with Rule 5 [Removal Criteria] of this Section."

While the words are different, there is essentially no change in ineligible areas. These are the areas that are not eligible for inclusion on the DXCC List and include extraterritorial areas, embassies, consulates, monuments, offices of the United Nations agencies, etc.

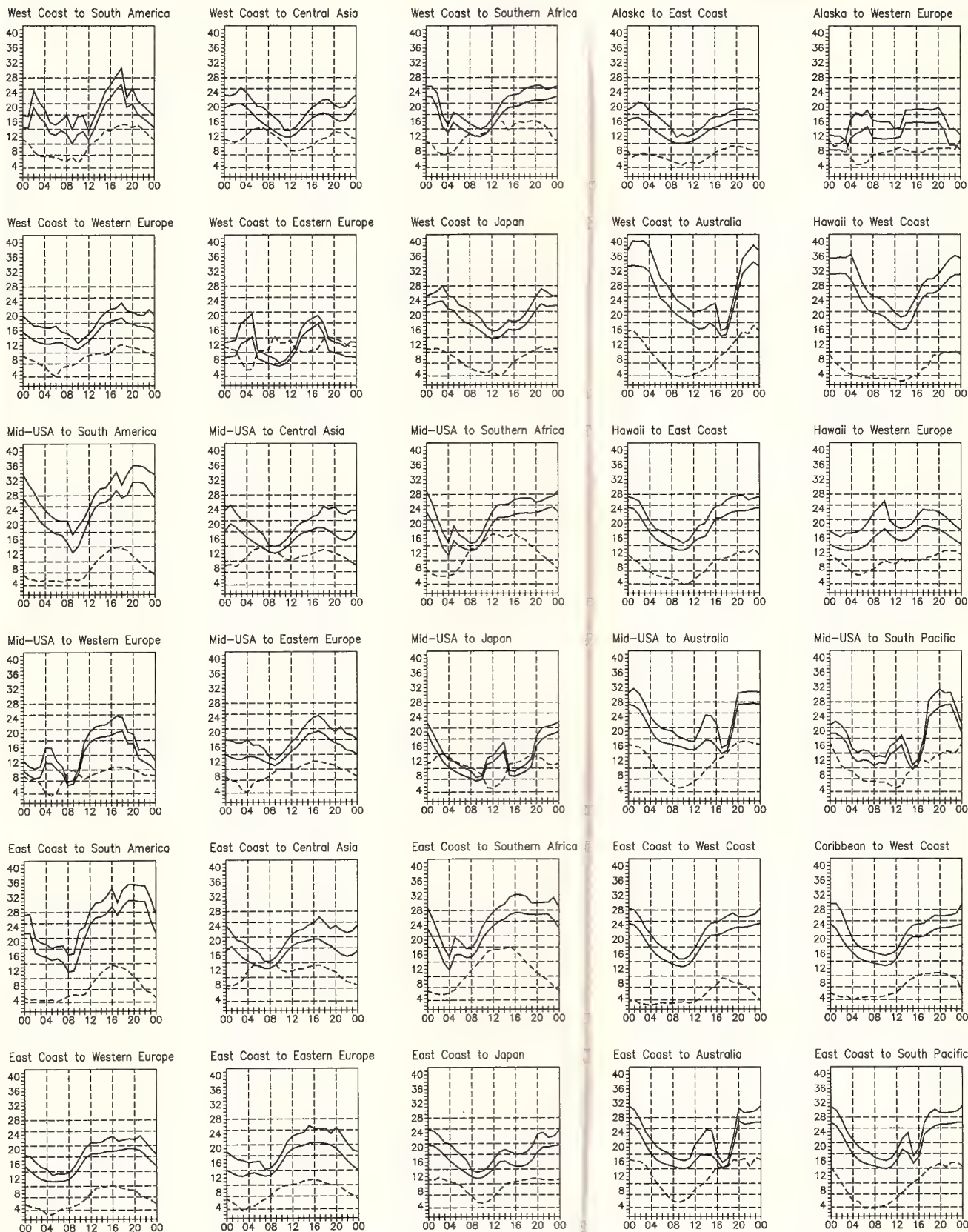
Deleted Countries

The way deleted countries are handled changes significantly. In the past a listing moved from the current list to the deleted list as part of the process. In the future, Entities will be removed, and credits will be removed. In keeping with a long DXCC tradition, this will not change any listings on the Deleted List as of March 31, 1998. This moves the emphasis in the competitive standings toward operating ability and station effectiveness.

More than New Rules

More than the recently approved new rules came from the DXCC 2000 ad hoc committee. In committee deliberations, the members envisioned new programs and services for DXCC participants. They also realized early on that any expansion would have to be preceded by fee increases and more efficient administration. Each year, the DXCC program costs League members over \$100,000 more than is received in fees and postage. The Board recognizes that it is not necessary for DXCC participants to pay 100% of the costs of the program. However, it is necessary that those of us who play this game pay our fair share.

The Membership Services Committee of the Board will oversee the implementation of the programs and ideas that came from the work of the ad hoc committee. Next month, we'll look at where DXCC is headed in the future.



When are the bands open? These charts, generated using IONCAP+ from CAPMan, show probabilities for average HF propagation from April 16 to May 15, 1998, for the paths indicated. The horizontal axes show Coordinated Universal Time (UTC), and the vertical axes frequency in MHz. On 10% of the days of this period, the highest frequencies propagated will be at least as high as the upper curves, and on 50% of the days they will be at least as high as the lower solid-line curves. The broken lines show the lowest usable frequency (LUF) for a 1500-W CW transmitter. For SSB or a lower transmitter power, the LUF will be somewhat higher than the curves indicate. See October 1994 *QST*, pp 27-30, and February 1995 *QST*, pp 34-36, for more details. The predictions for this period assume an observed 2800-MHz solar flux value of 114.

The “MO” of MOUs

The premier justification for continued access to our piece of the spectrum pie is, and always will be, public service. A major part of our public service activity is conducted in the context of the League’s formal agreements with six “heavy hitters” of the emergency management community. These include, in no special order, the American Red Cross, the National Weather Service, the Federal Emergency Management Agency, the Association of Public-Safety Communications Officials-International, the National Communications System, and the Salvation Army. We’ll take a brief look at each of these agencies, and our “method of operation” under each of our national-level formal agreements, also known as *Memoranda of Understanding* (MOU).

First, however, a few basics: A MOU provides a framework for cooperation and coordination with agencies to which we as radio amateurs provide communication services. At the national level, this means headquarters-to-headquarters contact periodically, to exchange news, views, information, and points of contact in the field. For example, ARRL staff attends the annual Red Cross partnership meeting along with representatives of other agencies and organizations (from the government and non-government, private and commercial sectors) that have MOUs with the congressionally chartered organization. The idea is to get to know one another on a face-to-face basis, so that when the detritus hits the fan, you know who to call and who you can count on.

At the local level, an MOU serves two purposes. First, it’s a door opener. A new ARES group is more likely to be heard and taken seriously by a local NWS office when accompanied by the agreement document signed by the head of the agency. The served agency says, in effect, we have examined this organization of radio amateurs and have found them to be trustworthy and able to render substantial and needed services for our field operations in times of emergency. The agency head is telling its field offices, “Go get ‘em—they are good for us.”

Secondly, once your foot is in the door, the provisions of the MOU document spell out the capabilities and organization of the servers (us), the organization and needs of the served agency (them), and the methods of operation. These are broad guidelines that lead to the establishment of a local memorandum of understanding or similar document that sets forth the detailed

operational plans and policies to be subscribed to by both parties during drills and actual events.

The most important step here is to ensure that both parties to the local agreement have a realistic assessment of the resources brought to the table by the servers, and the needs of the served. Fanciful expectations are the largest pitfalls leading to breaches of trust and a breakdown of relations, with each party going away unhappy and demoralized. Rifts develop, and, once in place, become recalcitrant. What’s worse, is that the public, the “clientele” of both Amateur Radio and the agency, is not served. The public has the true need.

American Red Cross

ARRL and the Red Cross have had cooperative agreements since 1940. The current statement was signed in 1994. Chartered by Congress in 1905, the Red Cross provides relief to victims displaced by disaster, from the onset of disaster conditions to the recovery phase. Their national

headquarters is located in Washington, but most of the action occurs at the state and local chapter levels, where the rubber meets the road. Local ARES Emergency Coordinators work closely with their counterparts in the chapter offices. Look at just about any summary of a disaster event, and you’ll find reports of amateurs on missions with Red Cross personnel and providing communications for shelter managers.

National Weather Service

Amateur Radio is almost synonymous with the SKYWARN program, the “eyes and ears” of the National Weather Service during severe weather emergencies. Hams comprise the majority of SKYWARN volunteers, who report “ground truths” to local NWS offices, supplementing their sophisticated weather monitoring equipment. ARRL has had an agreement with the National Weather Service, effecting this support, since 1986, making the NWS our “newest” MOU partner. The agency consists of a national headquarters in Washington, DC, with regional offices throughout the country, and has undergone considerable reorganization in the last few years. The SKYWARN program is one of the finest examples of hams providing public service.

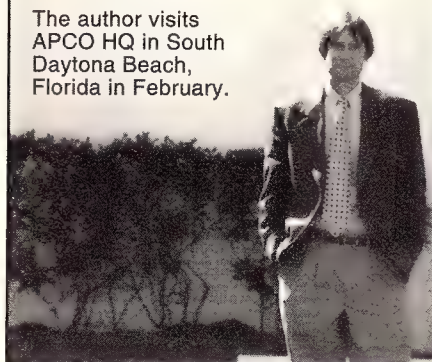
Federal Emergency Management Agency

FEMA is the agency that effects the federal government’s disaster response. The agency is criticized, often unfairly, for slowness in responding to disasters. The reason is that FEMA is a “last responder,” as opposed to first responders—the local, county, and state emergency management agencies. FEMA doesn’t enter the picture until the locals and the state are overwhelmed and the state calls in the feds. Much of the agency’s efforts are now geared toward mitigation, ie, building code revision, building away from flood plains, and municipal planning, particularly in coastal areas prone to hurricanes. FEMA also supports RACES.

The ARRL/FEMA MOU, in place since 1984, helps ARRL volunteers coordinate their services with emergency management agencies at all levels of government. FEMA and ARRL encourage the development of operating plans within the FEMA Regions. ARRL staff meets periodically to review RACES and other issues with their FEMA counterparts in Washington, DC. An updated MOU draft is currently on the table.

ASSOCIATION OF
PUBLIC-SAFETY
COMMUNICATIONS
OFFICIALS-INT’L, INC.

The author visits
APCO HQ in South
Daytona Beach,
Florida in February.



APCO-International

The Association of Public-Safety Communications Officials-International is comprised of communication professionals in emergency medical, law enforcement, fire, SAR, and other public safety fields. The *APCO Bulletin* is an excellent periodical devoted to a broad range of communication issues. (The June 1996 issue featured Amateur Radio.) Headquartered in South Daytona, Florida, the organization has numerous chapter offices across the country, the level at which ARRL volunteers interface with the organization. APCO-International promotes standardization, education, and information exchange. Amateur Radio is often represented at the organization's annual convention.

The ARRL/APCO MOU calls for pre-planning between local ARRL officials and APCO chapter officers to provide for supplemental communications services by amateurs during emergencies. A new MOU was signed in 1996. National-level coordination occurs between standing committees of both organizations.

National Communications System

The NCS is a unique organization. It is a confederation of 23 organizations across

the federal government tasked with ensuring the availability of a viable national security and emergency preparedness telecommunications infrastructure. The President designates member organizations that own or lease telecommunication facilities/services of significant value to emergency response or that have important telecommunication policy, regulatory, or enforcement responsibilities. The assets of these 23 organizations comprise the bulk of the federal government's telecommunication resources.

Veterans will recall the NCS "Night Tango" exercises of the '80s, designed to evaluate the capabilities of volunteer communication systems to support NCS goals. NCS recognizes the resources that trained radio amateurs bring to the table, especially through the decentralized field organization (ARES and NTS) of the ARRL.

Salvation Army

Last, but certainly not least, is the Salvation Army, which, for decades, has provided services to victims of disasters. Its national headquarters is in Alexandria, Virginia, and it's organized in four territories across the US, each having its own headquarters and corporate structure. Nine

to 11 administrative centers report to each territorial office.

The Salvation Army is particularly active in the recovery stage of disasters, and its communication needs often are filled by ARRL volunteers. ARRL staff meets with Salvation Army representatives each year at the annual NVOAD meeting in Washington. NVOAD is the National Voluntary Organizations Active in Disaster, of which ARRL is a member-organization. The ARRL and the Salvation Army revised their MOU in 1996.

Contact MOU Agencies

Our formal relationships with these agencies lend legitimacy and credibility to Amateur Radio and help to justify continued access to our spectrum. They provide the opportunity for individual amateurs and groups to meaningfully contribute to the public welfare, helping us enjoy a more fulfilling Amateur Radio experience. ARRL section leaders, especially Section Managers, Section Emergency Coordinators, DECs, ECs, and Section Traffic Managers, are urged to contact their local agency counterparts for opportunities to serve.

(For copies of the MOU documents, send an e-mail request to k1ce@arrl.org.)

QST

Public Service Honor Roll January 1998

This listing is to recognize amateurs whose public service performance during the month indicated qualifies for 70 or more total points in the following 8 categories (as reported to their Section Managers). Please note the maximum points for each category: 1) Checking into a public service net, using any mode, 1 point each; maximum 60. 2) Performing as Net Control Station (NCS) for a public service net, using any mode, 3 points each; maximum 24. 3) Performing assigned liaison between public service nets, 3 points each; maximum 24. 4) Delivering a formal message to a third party, 1 point each; no limit. 5) Originating a formal message from a third party, 1 point each; no limit. 6) Serving as an ARRL field appointee or Section Manager, 10 points each appointment; maximum 30. 7) Participating in a communications network for a public service event, 10 points each event; no limit. 8) Providing and maintaining an automated digital system that handles ARRL radiogram-formatted messages; 30 points. Stations that qualify for PSHR 12 consecutive months, or 18 out of a 24-month period, will be awarded a certificate from HQ upon written notification of qualifying months to the Public Service Branch at HQ.

980	203	172	158	148
NM1K	KE4PAP	KK3F	W7WAT	K4IWW
506	200	170	AC4ZHF	N2CCN
AA2CX	WA1TBY	WA5AA	AC4CS	W6QZ
407	190	169	N2JBA	NR2F
KA2ZNZ	N5NAV	K4RNF	KB2VVB	W5RZV
359	183	KA4RNF	AD4PDQ	157
W9RCW	KC5QGI	KD4DO	AE4EC	
282	198	W6IVV	KB5ZED	
KF1L	W2HOB	168	N4YYQ	WB1GXM
279	193	K10JO	WX8Y	146
N2YJZ	N2MSM	K9FHI	N4ZNO	N2FET
267	188	KA2GJV	155	N2FHJ
K4SCL	KB8ZYY	KA2YZM	K2UL	WB9TUS
264	182	166	154	K2GNZ
W2MTA	K7VVC	N2OPJ	N1VXP	AF4EG
258	180	164	153	145
WB4GM	NN2H	KA2VZX	N2WFN	N8FPN
252	178	WB5NKC	N2YV	WB0ZNY
N5WSW	W4PIM	KD4SIV	N5OUJ	144
235	174	K6YR	163	N2AKZ
N24O	178	WA2UKX	N2OJI	142
234	N2LTC	KD4TOK	KC5PNM	142
WBDOB	N5IKN	162	151	KE4JHJ
222	177	W9CBE	KD4GR	K9RTB
WB2UVB	KB2VYZ	WA4QXT	N2RPI	N2WGF
215	176	161	150	AA2ED
K5MC	K0IPS	W4EAT	WA7EES	WB2ZCM
208	175	W5OYH	149	141
WA9VND	W9YCV	W5YQZ	KA9ELZ	KA9KLZ
206	173	W3YVQ	AA0OM	W4BNY
W7TVA	N2GJ	KB2TIY	KF9AS	140
			KC5OZT	AB7NK

AA4HT	124	KB2KLH	W5MEN	88
N1LKJ	W7GHT	WD0GUF	102	KB3AMO
N8IXF	123	KG2D	K9LGLU	W2CC
139	KG6TU	WB2QIX	N2ZMI	87
AF4NC	KB2VSD	KO6RZ	WB2CZW	AA8SN
K5DPG	WA4EIC	WA4NDA	101	AA8PI
N2XJ	122	113	W2AZ	KB2ETO
138	K7BDU	N3WK	100	AE4WP
N9BDL	N7DRP	KB2RTZ	W7EP	KD6YJB
W7GB	W7VSE	KB2KOJ	N2AYK	86
N1KPT	121	WA2SEI	KB2GEK	WB9GIU
136	K4MTX	KF4NFP	WD5GKH	WA4EYU
K2DN	K0PZ	112	W5ZX	WA5FZQ
KT6A	AA9HN	WB5CXK	85	N5IJR
N3DRM	N3DRM	AG9G	99	84
134	WA1FNM	KB2JJD	WA2CUW	AA4YW
NX1A	120	N2WFX	N4JAO	WB0DTI
W2RJL	K5IQZ	WA4TVY	98	KG7LS
K2BCL	WB2GTG	N1IST	N8JSO	W7PFD
KA4FZI	N7YSS	111	WB4PAM	W0MZI
KA4UIV	K4FQU	WA1CSO	97	83
N8FWA	NZ1D	KE4DNO	97	N4JTG
133	WB7VYH	N8DD	WR8F	82
AF4GF	119	110	N2JRS	N2WDS
132	KA1GWE	KT4SJ	N1SGL	W5HK
K7GXZ	KA7AID	KC6SKK	KE6GFV	96
131	N1DHT	KD2OPJ	109	81
W00A	W1PEX	K4AIF	W2PTZ	KJ3E
AF2K	WB2EAG	K4UHC	KB9GGA	KD4JMV
118	KE4OAV	N9KHD	95	80
K4CWZ	WB0WVJ	KC2ACL	N8TDE	KA9FVX
130	K9GBR	K4RBR	AA2NX	W5CU
KE0K	KA2DBD	108	KC2AGL	79
KR4MU	KE4IFD	N4GUM	94	K4BW
KD7ME	KB5TCH	WD9FLJ	WA1QAA	KF4LBD
W7ZIW	W4CLS	WA8DHF	KC5VLW	W4OGG
W12G	KA1OTN	K7MQB	KF4TOX	78
WB2FGL	N1CPX	K5UCQ	N8VES	N7MPS
WN0Y	W5CTZ	WB5YDD	KB8ROA	77
129	117	107	N8YXL	K8SH
WA0TFC	WB5CDX	N3WKE	93	76
KA6AGD	W2FR	KA7YYR	K0GIV	W4QAT
AE4UB	WB8KWD	106	WA4DOX	KA1VAX
WX4H	116	KG5GE	KG6IW	NN7H
128	K4WOD	W2PIL	92	75
N0UOD	KF4FXT	W4X1	K2VX	N5BMB
KA2CQX	W4JLS	105	KA1VEC	74
127	W1ALE	91	KA4LRM	W7NWP
WD4MIS	KA0UEQ	115	WD4DGH	KD4HGU
KD4PWK	126	KB2CDB	W8SGH	KB4WBY
126	KA1WCD	W9UMH	90	KE4CAP
125	WB5NKD	N5JUU	K3UWO	K1SEC
KI4YV	K5AO	104	N1TDF	N1LAH
W0OTF	W2MTO	103	K04OL	W7UVP
N2XOJ	114	KE1AI	89	73
NR9K	WA3YLO	KB2UQZ	WD4ZND	KB2VXF
		AB5RV		

72	N2VQA	70	KB2EAL	KB2HJJ
N4MM	W4ZBA	KF4DUS	KB2RHI	N2FHK
71	KT4DU	KB2VSR	N2WXE	N2SOE
KB2YBM	K8WC	WB2CAK	N2WVG	KR4ZO

The following stations qualified for PSHR during the month of December, 1997, but the results were not reported: KE6NTZ 222, KC4RNF 170, WB4GM 169, KL7Q 157, AC4CS 134, WB4TVY 132, W4PIM 129, AE4WP 120, W4CKS 118, W4DGH 104, W4X1 94, W4QAT 93, KE4CAP 89, KR4ZO 75, W4ZBA 70. (Nov) KE6NTZ 151, W6DOB 212.

Brass Pounders League January 1998

The BPL is open to all amateurs in the US, Canada and US possessions who report to their SMs a total of 500 points or a sum of 100 or more origination and delivery points for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL radiogram format.

Call	Orig	Rcvd	Sent	Divd	Total
WX4H	9	1370	1329	12	2720
W3VR	699	501	760	38	1998
W1FYR	0	870	907	2	1779
WB0WNJ	0	279	1135	0	1334
N2LTC	0	604	641	10	1255
W0WPD	31	634	53	415	1133
WX4H	3	548	484	8	1047
AA2CX	142	387	203	186	918
K7VVC	28	379	396	6	809
KK3F	32	90	710	40	872
W1PEX	1	636	212	4	853
WA9VND	8	366	362	22	758
W9IHW	2	442	38	290	752
K9JPS	0	417	39	288	744
WB9JSW	0	397	39	274	710
KT6A	4	381	320	4	709
N5IKN	0	353	112	241	706
W0LVI	25	382	122	178	707
W9RCW	0	366	81	221	688
W6DOB	3	248	327	83	661
KA2ZNZ	7	284	187	172	650
W0GGP	57	324	0	230	611
W3KOD	1	254	340	0	595
WB5NKC	21	215	334	21	591
N3DRM	1	288	270	12	573
K10JO	0	262	304	0	566
KT1Q	0	286	257	19	562
KA2GJV	0	237	316	0	553
KA1VEC	13	247	263	8	531
N8IXF	1	260	257	1	509
KE4DNO	4	184	310	4	502
N0KJ	—	—	—	—	500

BPL for 100 or more originations plus deliveries: N0DKK 206, N24O 163, K1TQY 145, N5GBN 145, K0IBS 135, K4SCL 129, N5WSW 122, WB4GM 120, KE4PAP 118. The following station qualified for BPL during the month of November, but was not listed in February QST: W6DOB 660.

QST

Your Technician Accent...And What to Do about It!

By James 'Jay' Craswell, W0VNE
321 4th Street West
Jordan, MN 55352

To quote from "Your Novice Accent," the classic November 1956 *QST* article by W6DTY, "People speak a language with the same accent as those with whom they live and work. New hams pick up habits and operating procedures of the gang they chew the fat with." How true this still is. I feel that the large influx of Technician licensees has created some of the same problems experienced by Novice operators of the '50s. I hope that people won't see me as finding fault with my fellow hams. Please take it in the spirit it was intended. It was prompted by my wife's (N0KJH) honest question: "Tell me what you think is correct procedure?"

FM and Repeater Procedure

"KD9XYZ KD9XYZ KD9XYZ this is KE9ABC calling and listening, bye."

KD9XYZ KD9XYZ KD9XYZ here is KE9ABC are you around Fred?"

"Negative contact. KE9ABC clear."

On FM a single call is all you need. I suppose in some rare cases the person being called is operating their receiver in the scan mode and won't catch the more acceptable "KD9XYZ, KE9ABC." And there is no reason to throw in "negative contact," "clear" and so on. Everyone who can hear the repeater knows quite well that you have had "negative contact." I think habit arises from people who spend too much time listening to police scanners and not enough time listening to proper Amateur Radio procedures. Being "clear" on the police band is a signal that you are free for the next assignment. On Amateur Radio if you are not in contact with a station it is assumed you are "clear." Let's ditch the Highway Patrol procedures and extra yakking. It sounds silly.

Endless Calling

You will often hear the same long calls repeated over and over. This is unnecessary. On FM your signal is copiable, or it isn't. As my friend Tom says, "If you weren't there you didn't miss anything." If you call and no one responds they will rarely change their minds two seconds later. Most of the time a general call should be as simple as "KD0YXZ listening." Once in a while I'll say, "CQ 2 W0VNE." This gives some people the giggles, but every-

one immediately understands that I am calling any station.

Listen!

One rude practice is turning to a new frequency (or flipping on the power switch) and talking without listening. *Listen first!* Before you pick up the microphone for the first time, spend hours, even days, listening. Learn the proper procedures on your local repeater before jumping in.

Q Codes, Spelling, RST and The Weight of Correct Operating

"QSL your hamster died, QSL on the good old days, Bob. Yeah, QSL on your new antenna. You're eight pounds now, Bob. I suppose you could get a linear for that FM rig and push me 9 or 10 pounds, huh? The handle here is Frank. F-R-A-N-K."

The dreaded Q codes are making another stab at polluting the phone bands. Q codes are meant for CW. This habit of "QSLing" everything is a little like the idle character on a teletype circuit. Please assume that everything is received unless otherwise specified. It sure makes for tedious listening when every single thing said is repeated. If you must acknowledge a transmission, you don't need to repeat yourself over and over. "Good copy, Bob" is short and to the point.

When words must be spelled, they should only be spelled phonetically. For example V, B, E, G, D and C all sound pretty much the same. That's why phonetics were created. Spelling your name on an FM repeater (even phonetically) is questionable at best. The exception might be if your name is truly unusual, or if your signal is marginal into the system.

Your *handle*? When I heard this for the first time, I thought, what the heck is this goofball talking about? Sorry, I have *knobs* on my radio, but no *handles*. The most important lesson is to speak plainly, just as you would in person. When you meet someone new at the radio club you don't ask them for their handle. You ask for their *name*.

Signal reports should follow the RST (Readability, Signal Strength and Tone) system. Not in "pounds," "feet," or "shoe leather." You *will* hear old-timers saying "Q5" once in a while (historical note: The readability or intelligibility scale goes from 1 to 5—see QRK in any list of signals). But for most voice operations, RST works best. Of course, you drop the Tone figure unless

you hear some unusual noise on their signal (such as alternator whine). Some stations just give the signal strength in S units. "Bob, you're S8 now." Others provide the readability and signal strength by saying, "You were 5 by 8 on your last transmission." If someone specifically asks for a report, it is important that you give an accurate report. My minority opinion is that DXers and contesters who give 59 for everything (while asking for several repetitions of "all after crackkkle-spffft") is a waste of time. If you give a signal report, give a real one.

Phonetics

Cute nonstandard phonetics are questionable at best. My wife sometimes tells people her call is November Zero Keep Jay Hopping. Kind of silly, but it might help some folks remember her call sign. The line is crossed when you become vulgar.

IDing

"KD9XYZ this is KE9ABC for ID. Yeah, Bob, we got our ticket back when you had to memorize the license manual. Our transmitter is a GadZooks 1001. We like to operate with our feet hanging out the window."

"For ID?" Isn't it understood that you are identifying? And the royal "we" is heard so often that "we" have to comment. Who is this other half of the "we" / "our" in your transmissions? When I was a young squirt and picked up this bit of silliness I was asked by one of the old-timers who was this "we"? Me and the mouse in my pocket?

Endless Signoffs

"Well, Bob, may the good Lord take a liking to you and yours. Have a good day today and a better day tomorrow. We will be clear on your final and I wish you 73s and a goodnight. This is KD0XYZ clear and QRT."

Nice sentiments (I do hope the good Lord takes a liking to me), but let's lose the canned "CB" jazz. The point is that these sign-off benedictions drag out an otherwise nice conversation. 73s? Best Regardses? Is this a form of stuttering? I won't belabor the fact that 73 is CW shorthand since everyone (even me) uses it, but let's use it correctly.

If you avoid some of the operating pitfalls we've just discussed, I guarantee you more contacts. Best of all, you'll rapidly earn the respect of your fellow amateurs.

Q57

Packet Radio's Rebirth in Southeastern Arizona

by Randy Harper, N1NGN

Contrary to the skeptics, there are places where packet radio is making a comeback. It's more diversified and feature packed than before. This is the story of packet's rebirth in southeastern Arizona.

In mid-1994, some South Eastern Arizona Radio Society (SEARS) members returned from Germany after using the German RMNC/Flex-Net system with its excellent backbone and routing. They were hoping to find an existing, high-speed, state-of-the-art packet network here. Were they in for a surprise!

The existing network consisted of antiquated equipment, mostly running X1-Jx variations of NET/ROM burned into old TNC-2 clone EPROMs. The nodes ran with static node tables that did not recognize some nodes and did not adjust to changing conditions, such as nodes dropping in and out of the network. A number of nodes listed in the tables were not connectable.

Needed List

In March 1996, SEARS (a long-time supporter of RACES/ARES) decided that packet would be an asset for emergency communications. Upon studying the existing, declining packet network, SEARS decided to rebuild and improve it. What had to be done? What was broke? How could we rekindle interest? SEARS decided that first, the system should work well and be mostly transparent to the user. Connectivity needed improvement, and congestion on 145.01 needed reduction. A reliable, RF-based mail system was required to support RACES. The system should support TCP/IP and be NET/ROM compatible with dynamic routing. We decided to make at least one port on each node a 9600-bit/s user port. Where possible, we would also use 9600-bit/s links to increase speed.

Mountaintop BBS-Node-TCP/IP System

After getting frequency coordination, SEARS built its first in a series of new nodes that were AX.25-NET/ROM and TCP/IP compatible. This was the SEARS:W7DZG

node installed near Bisbee, Arizona, on Mule Mountain at 7500 feet. The system was an immediate success providing 9600 and 1200-bit/s user access, mail forwarding and a 9600-bit/s backbone link to Phoenix and New Mexico.

The completely RF-based mail system sent and received mail through the WB7TLS BBS in Tucson, handling 100 to 300 messages and bulletins a day. This project was a joint venture with the Cochise Amateur Radio Association (CARA). The BBS portion of the node replaced their previous RF-based BBS that was lost because of an unreliable Internet gateway.

The SEARS node solved the problem of having working nodes and out-of-area digipeat capabilities. Its "what you see is what you can connect to" philosophy allows you to connect to whatever you see in the node list. The quality is set high enough so that nodes with bad paths are not passed on to neighbors. Also, the node table is dynamic; nodes are added or dropped depending on changing conditions. Moving the BBS to its own frequency away from the congestion and "hidden transmitters" on 145.01 contributes to its success. It is now possible to send and receive mail and bulletins over RF from a wide-open Internet converse server. Users are no longer at the mercy of a single, finicky gateway and the flood of traffic on 145.01 MHz.

Node Upgrade

The next step was to upgrade the aging CARA node (BISBEE:K7RDG on 145.01 MHz) for compatibility with the SEARS node. The BISBEE node is located on the same mountaintop, but with its own tower and building 200 feet from the SEARS facility. The club call sign had changed and the old TNC EPROM had to be burned for the change, so it was an ideal time to upgrade the TNC and radio to be more network compatible.

SEARS agreed to help CARA upgrade the node. CARA provided the equipment and SEARS volunteers installed and tested the system. This node now has a good link to Tucson and covers a large part of Cochise County. It also supports TCP/IP and has dynamic node and routing tables.

Adding an Internet Gateway

The next upgrade was not part of the original plan, but the need for a functioning, Internet gateway was demonstrated during

the deployment of several military members overseas. The SEARS node serves the nearby military base (Fort Huachuca) and many SEARS members are in the military, so we decided to create an open Internet gateway that would also support the county RACES mission. The gateway name is SEGATE (South Eastern Arizona Gateway).

With the help of Cochise College, SEARS assembled an Internet gateway with 9600-bit/s user access and links to the SEARS and BISBEE nodes. AXIP routes (basically "wormholes" or virtual direct-connect paths via the Internet) were set up to existing gateways where US service personnel are routinely deployed, such as Hungary, Croatia, Bosnia and Germany. Thus, SEGATE and the local major nodes appear in the node lists in those countries and provide an easy, reliable connection home. This system was tested during a command visit to Egypt. It was possible to telnet back to SEGATE, send and receive e-mail and connect to friends and family.

Reconnecting to New Mexico at 9600

A severe storm took down a tower on a 10,000 foot mountain along with the antennas of a dual node that was a crucial link between New Mexico and Arizona. Due to weather problems and other considerations, that node would not be restored soon. We had considered adding a node halfway to New Mexico that would strengthen the 9600-bit/s route. This was just a catalyst to make it happen sooner. A dual-port KPC-9612 TNC in stand-alone K-NET (NET/ROM) configuration, along with a 20 W, 2 meter radio and a 5 W, TEKK UHF radio were installed on Dos Cabezas mountain at 7600 feet. Located about 20 miles southeast of Wilcox, Arizona, 2HEADS:KA7TXS-4 links SEARS (60 miles to its west) with SVC:WY5G-1 in Silver City, New Mexico (90 miles to its east), at 9600 bit/s. User access is on 144.93 MHz at 1200 bit/s. This makes it possible to connect at 9600 bit/s over all-RF links from Sierra Vista, Arizona, to El Paso, Texas, and beyond. On a recent trip to El Paso, I continuously connected all the way back to SEGATE over RF links using just three nodes as entry points.

In the May "Digital Dimension," N1NGN will describe how SEARS overcame Mother Nature, nay-sayers and Murphy to build this super packet system.

QST

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144 MHz Winter E Skip and FAI

There have not been winter sporadic-E events like those of January 1-2, 11 and 11-12 in many years. VHFers throughout the country made hundreds of 6 meter double-hop contacts on all three days. More astonishing was the number of 2 meter sporadic-E contacts, including several over double-hop paths. 144 MHz QSOs via field-aligned irregularities (FAI) were also completed across the Southwest during these events. These cases nicely illustrate Whitehead's explanations of the association of FAI and sporadic E, which appeared in a two-part article published in *QST* this past October and November.

January 1-2

Six-meter operators in Southern California and south Texas heard the band open late on January 1. KC6WFS (DM04) was working south Texas stations as early as 2330 UTC and Roger Wagner, K6LMN (DM04), discovered 6 meters open around 0015. In addition to working the loud Texans, Roger also found stations in Colorado and double-hop activity east to Illinois and Georgia. He also noted stations as close as 700 km in Arizona, which suggests the MUF was considerably higher than 100 MHz.

WA5IYX (EL09) watched the sporadic-E MUF rise rapidly through the lower TV channels and into the FM band. By 0000, Pat had already logged FM broadcast stations from South Dakota, Wyoming and Colorado. Suddenly at 0050, K0GU (DN70) came booming through on 144 MHz from Colorado. During the next hour, Pat heard only bits and pieces from stations in Colorado and Utah, but other 2-meter operators were having better luck. K0GU ran off more than a dozen 144 MHz contacts in south Texas grids EL09, EM29, EM00 and EM11 between 2355 and 0101. At the same time, Ron Marosko, K5LLL (EL29), made three contacts in Colorado and Arizona.

The most interesting aspect of this intense sporadic-E opening involved the simultaneous 144 MHz contacts made via FAI. Ned Stearns, AA7A (DM43), in southern Arizona had an interesting experience. Around 0015, he noticed some FAI-like characteristics on the 6-meter signal of WA6PEV (DM15), who was then running south Texas stations. Alerted that FAI was

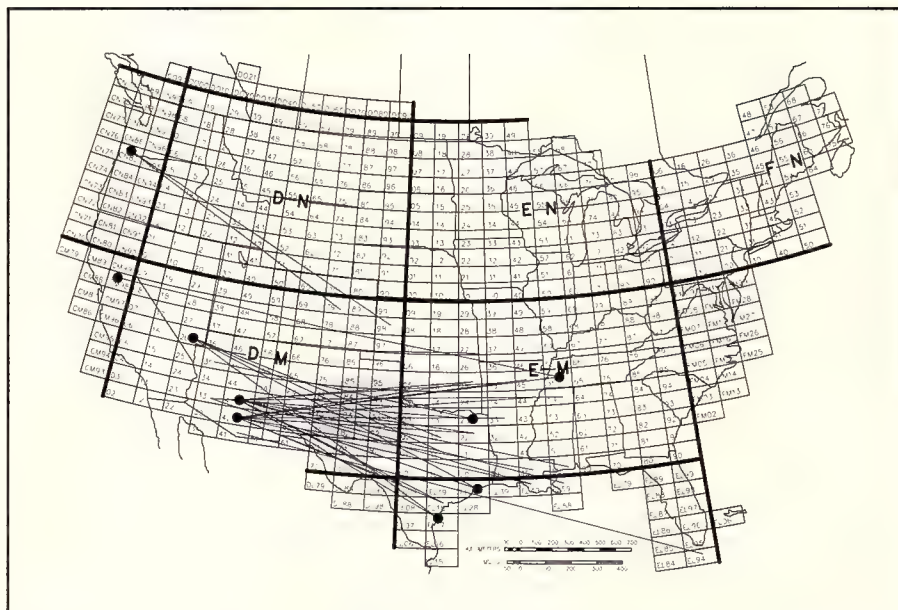


Figure 1—Lines show contacts reported on 144 MHz sporadic E, January 11-12, 2240-0050 UTC. The dark shaded area encompasses the midpoints of contacts made over the Southwest and suggests the responsible region of intense sporadic E activity. Note the outlying contacts to the north and the second hop over the Gulf of Mexico. Reporting stations, shown by the large dots, are: N7EIJ (CN85), N6KBX (CM98), K7ICW (DM26), AA7A (DM43), N7WS (DM42), W5UWB (EL17), K5LLL (EL29), KD5BUR (EM23) and KD4NOQ (EM55).

present, Ned turned his 144 MHz Yagi array toward the sporadic-E center, which he knew must be to his northeast, based on what he was hearing on 6 meters.

After a few minutes of calling CQ, AA7A raised KK6IT (EM11) on FAI. Further calls on 144 MHz netted WA5ASW (EL29) also on FAI, but N0EQO and KA0NNO (both EM24) had pure sporadic-E signals. Ned observed that this was the first time in 15 years experience that he worked both 2-meter sporadic E and FAI at the same time. He also noticed that the signal from KD5BUR (EN23) actually switched back and forth between the two propagation modes. All this is quite consistent with a large and intense sporadic-E

region, accompanied by FAI features, situated over the panhandle region of Texas.

Other 2-meter contacts seemed to confirm the existence of an intense sporadic-E center over northern Texas. Colorado stations K0GU (DN70) and K0JY (DM68) were running southern Texas stations after 0000, while K5LLL (EL29) worked both Colorado and southern Arizona, suggesting that another intense sporadic-E center existed over west Texas and southeastern New Mexico. This second region may account for the FAI contacts AA7A made into EM11 and EL29.

January 11

Intense sporadic-E appeared again after 0130 on January 11 (late Saturday afternoon local time). Leo Fahmie, KJ6HI (DM03), worked into Kansas, Oklahoma, Texas and New Mexico on 6 meters and made numerous double-hop contacts to Illinois, Kentucky, Tennessee, the Carolinas and Virginia. Kevin Bishop, N8ZJN (EM79) in southern Ohio, found 6 meters filled with double-hop stations from Arizona and Southern California after 0200.

This Month

April 3-4	Southeastern VHF Society Conference (Atlanta, GA)
April 5	Good EME conditions
April 13	144-MHz Spring Sprint
April 21	222-MHz Spring Sprint
April 26	Good EME conditions
April 29	432-MHz Spring Sprint

*Send reports to Emil Pocock, Box 100, Lebanon, CT 06249. Leave voice messages at 860-642-4347, or fax 860-594-0259 or e-mail w3ep@arrl.org.

FAI was again evident on 144 MHz over the Southwest. AA7A hooked up with KK6IT (EM11) via this means at 0150 and found that signals peaked with an antenna heading of 70°, considerably northeast of the great circle path—as might be expected. Ned then wondered if raising the elevation of his six-Yagi array might help. He checked the path using *SE-Prop*, the sporadic-E and FAI analysis program by James Roop (K9SE) and discovered that the likely position of the FAI scattering point was at 11° elevation. When Ned raised the antenna to 13°, he could hardly believe how strong some of the Texas stations had become—up to 4 S-units louder!

January 11-12

The best of this trio of openings began at Sunday afternoon local time and affected most of the country. KJ6HI reported 6 meters open from Southern California as early as 2200 on January 11, but he did not start working stations until 0145. His log showed the familiar pattern of single-hop stations in Oklahoma and Texas, with double-hop contacts into Louisiana, Mississippi, Georgia, Florida—and the Bahamas! He also found W7EW (CN84) in Oregon, apparently via a completely separate sporadic-E region.

This is consistent with reports from the Pacific Northwest. Mark McMillan, N7EIJ (CN85), had a fantastic time from Oregon. Mark's single-hop QSOs centered on Colorado, but they included stations throughout Southern California, Arizona and New Mexico. His double-hop contacts extended from Missouri and Mississippi to Georgia, Florida and the Bahamas. The contact between N7EIJ and C6AGN (FL16) was about 4575 km, the longest for both stations and near the ordinary double-hop limit.

Bill Wiseman, C6AGN, had a tremendous time of his own from the eastern side of the opening. Between 2310 and 0330, Bill made dozens of contacts in over 50 grids scattered throughout much of the country, from Rhode Island to Minnesota, Tennessee to Texas and west to California and Oregon. Reports from other stations confirmed the widespread nature of sporadic E that afternoon and evening. David Greer, N4KZ (EM77), worked several stations in Arizona and Southern California, mostly on CW because signals were weak and the band was crowded. Arliss Thompson, W7XU (EN13), and other South Dakota stations snagged XE1AVM (DK79) while all this was going on! N7DB (CN85) heard W7XU at about this time, but apparently no contact resulted.

If all these were not enough, there were also tremendous conditions on 144 MHz for the third time in the month. N7WS (DM42) reported 2-meter E-skip contacts as early as 2243 and logged more than 40 stations by 0047, scattered from Arkansas and Oklahoma to Louisiana and Texas. His longest contacts were probably with AG4V, KD4NOQ and KS4KO (all EM55)

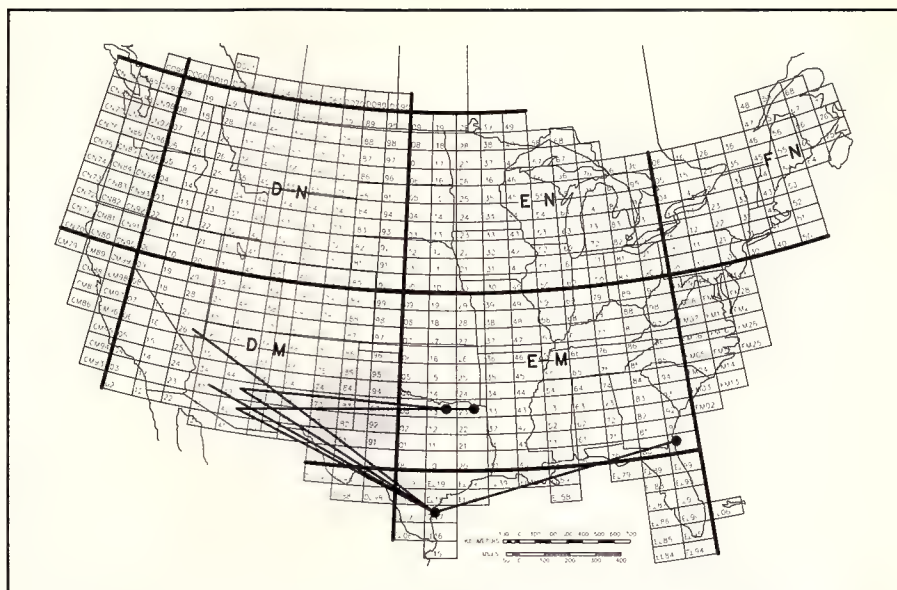


Figure 2—Lines show the great-circle paths of 144 MHz FAI contacts made January 11-12, 2240-0230. The actual signal paths were undoubtedly skewed to the north. The responsible FAI scattering centers probably lay to the north of the path midpoints, but within the shaded area that represents the extent of intense sporadic E. Compare with Figure 1. The lone FAI contact along the Gulf Coast is consistent with sporadic-E activity reported in the same area. Reporting stations, shown by the large dots, were: WA5TKU (EM13), KD5BUR (EM23), W5UWB (EL17) and W4UE (EM90).

at about 2050 km. AA7A made an impressive string of 38 contacts as far west as EM55 and EM54 (also at about 2050 km) and learned later that Jordan Marsh, WB2QLP (EL96), heard him in Florida via a second hop, but no QSO resulted. See Figure 1.

Jordan reported that at least one Florida station did have better success in working Arizona. W4WHN (EL94) found DM41 stations KE4OJN/7 and WB8LNG/7 in the melee between 2330 and 2335. The distance was about 3000 km, quite extraordinary for 2-meter sporadic E, especially in winter. Other unusual 2-meter contacts were made well to the northwest of the main action. N6KBX (CM98) and WA4HFN (EM55) hooked up at 0055, for example, at the impressive distance of about 2850 km.

Two-meter FAI appeared once again almost simultaneously with the E-skip. The lines in Figure 2 show the FAI contacts, but keep in mind they were made via paths that were probably skewed to the north. FAI formed in association with intense sporadic-E centered over west-central Texas was probably responsible for the contacts from New Mexico and Arizona to southern Texas. Similarly, the more northerly contacts were probably made possible by FAI over the Texas panhandle, which was consistent with intense sporadic-E activity in that area.

What a month that was for sporadic E and FAI, rivaling the very best that any series of summer openings has offered recently! Nearly all of these contacts were made on SSB, but at least one station had good success on 6-meter AM near

50.4 MHz. As is the usual case with 2-meter FAI, CW was required for most of the contacts. Several operators also mentioned using CW on 50 and 144 MHz when E-skip signals were weak or there was too much QRM. Others noted that stations seemed to be spreading out more on both bands, alleviating a good deal of QRM and making it possible to complete more contacts.

ON THE BANDS

There has not been such an exciting January in many years on the VHF bands. There were at least 17 days with sporadic E on 50 MHz somewhere in the country, including the unusually intense openings reviewed in the lead story. There were some overlooked tropo opportunities across the Gulf, including some 2-meter contacts on January 11 that got lost in the great sporadic-E openings. Additional 6-meter DX, aurora and meteor-scatter reports round off the month's offerings. Dates and times are UTC. Thanks to WV1C, KB2TGU, N3KWQ, K7ICW, N0LL and W0TMK—not otherwise mentioned—for their contributions to this month's summaries.

Six-Meter Sporadic-E

The extraordinary openings of January 1-2 and 11-12 were not the only E-skip events for the month. Sporadic E was also evident on 50 MHz somewhere in the US or Canada on January 3, 8 through 14, 16 to 18, 20, 30 and 31. Single-hop events predominated, but they were still enough to generate excitement. Chip Margelli, K7JA, was delighted with the "summer in winter" conditions, especially the double-hop opening he found on January 13. During a three-hour stretch just after 0000, Chip worked several stations in Florida, Alabama and Georgia, along with C6AGN on 50.098 CW. Chip was running just 100 W to a three-element Yagi at 20 feet. He also noted an opening north to the Pacific Northwest and Alberta at the same time.

Six-meter conditions over the contest week-

end of January 17-19 were the best many operators had seen in many years—and better than the June contest for some! The band was open from Southern California to the east as the contest began, and other parts of the country had sporadic-E before evening. Florida stations worked widely throughout the northeast, while the central part of the country probably had the best overall conditions. South Texas stations had many hours of sporadic-E in all directions during the two-day event, enabling some of the more successful operations to log more than 300 QSOs and 125 grids.

Several operators commented favorably on the general movement up the band. There was considerably less jostling around 50.125 MHz, as stations could be found calling CQ all the way up to 50.200, even when there was no sporadic E. Activity on 2 meters was similarly spread out, with the result that there was substantially less QRM and fewer frayed tempers.

There were widespread openings on January 31, to end this full month. Between 0200 and 0305, KC6WFS reported contacts into New Mexico and northern Texas from Southern California. CO2OJ noted his first opening of the new year for an hour and a half after 2030. He made 41 contacts in 14 EM grids throughout the South.

Six Meter DX

DX was scarce after the December 31-January 1 excitement of the first F₂ opening of Cycle 23 from the US, but W7XU (EN13) did have a close call. ZL2TPY heard Arliss running W6s on 50.170 MHz on January 2 between 0042 and 0133, but could not break the pile up, even though he heard W7XU as loud as 59. ZL2TPY had no luck in the DX window either, despite repeated CQs. That same evening, WB2QLP (EL96) worked PY5CC (GG54), PY2XB (GG66) and HK0HEU (EK92)—San Andres Island, a separate DXCC country.

Ed Rodriguez, WP4O (FK68), continued to work South America in January via transequatorial (TE) propagation. Ed worked PY5CC on many days during the month, along with PY2XB on January 21. Ed ran a string of Argentine and Uruguayan stations on January 20 starting around 0000. Soon after the run began, LU2EGQ heard both Ed and WP4MSL on 144 MHz, but the Puerto Ricans could not hear the Argentine's 25 W signal. Ed worked LU2EGQ again on 50 MHz just after 0100 on January 22, but heard nothing on 144 MHz.

PY5CC made some interesting contacts on January 14 after 2130 with LU9AEA (FE60) in Patagonia and with LU1ZC (FC97) on Deception Island. PY2XB also made contact with LU1ZC on January 25. These were not the first 6-meter contacts ever made from Antarctica, as Eric Jamieson (VK5LP) noted in his VHF/UHF column for March *Amateur Radio*. VK3OT, VK3LK and VK5NC worked VK0AQ in Antarctica during November 1993. Unfortunately, LU1ZC's stay in Antarctica ended in February. From this side of the equator, Steve Wilson (FN41), briefly heard PY5CC on January 18 around 0040, on what must have been a sporadic-E to TE link.

Aurora

One lone radio aurora occurred during the month on January 7 between 0030 and 0830. The relatively late start may have caught some operators off guard, and most of the reported activity was centered in the Great Lakes area. W7XU logged 36 stations on 6 meters as far west as VE6EKP (DO33), east to VE3CTT (FN07) and south to N8ZJN (EM79) in southern Ohio. He also made a few 2 meter contacts, but over a more limited area.

Meteor Scatter

The Quadrantids is an intense but short-lived daylight meteor shower, often overlooked by the scatter crowd. Jason Baack, N1RWY (FN54) tried it for the first time this January 3 and made two out of his three 144-MHz SSB schedules. He completed with N4OFA (EM86) and KW0A (EM48) at 1930 km for a new state—Missouri. KW0A also worked K0GU (DN70), along with W4UE (EM90) the next day, using high-speed CW for both contacts. Al Olcott, K7ICW (DM26), found 50 MHz quite lively after 1730 and was able to move KA7GUX (DN17) and N7ML (DN45) to 144 MHz, where he worked them. Al noted some meteor enhancement on several 2-meter tropo contacts beyond 600 km.

NOTES FROM ALL OVER

Tropo Ducting between Florida and Mexico

Fernando Garcia of Monterrey, Mexico (DL95), posts television DX reports from time to time on the W6YX VHF Internet reflector. His list of stations heard for January 19 and 20 is most interesting, because it includes two-dozen UHF TV stations all along the west coast of Florida. Among the most distant were WXEL (TV-42) and WFLX (TV-29) from Palm Beach, nearly 2000 km away. More astonishing was the complete lack of simultaneous reports of 144, 432 or 1296 MHz activity in the area on those same days. It seems likely that some very long contacts could have been made, at least to populated areas in Texas. Fernando uses a seven-foot screened dish and an eight-bay wideband UHF array as antennas. He is 1800 feet above sea level.

Microwave Activity in Kentucky

Jack Nyiri, AB4CR, and K4EFD have been running short-distance tests on 5.6 and 10 GHz using Down East Microwave transverters and 24-inch dishes with triband feeds. They have completed QSOs with strong signals over a 29-km obstructed path and are looking forward to longer contacts. Is anyone out there waiting to work Kentucky on the microwave bands?

Amateurs Hear the Lunar Prospector

Al Ward, W5LUA, was among several microwavers around the world who heard the Lunar Prospector's 2273-MHz signal while the spacecraft was on its way to the Moon. Al first heard the signal on January 8 at 0500 and for several days following. Al listened on a homebrew transverter with a 0.4 dB preamp, an FRG-6900 receiver and the 5.0-meter dish he normally uses for 2.3 GHz EME contacts. The signals were as strong as 10 dB above the noise in a 2.4 kHz bandwidth.

Al observed an odd phenomenon, which Paul Wilson, W4HHK, called the "hook effect," after hearing it on the 2287.5 MHz Apollo signal in 1971. It is a sudden change in frequency as a spacecraft moves around the back side of the Moon. The spacecraft's signal suddenly shifts upward by several hundred hertz and stays there a few seconds before disappearing. A conventional Doppler-shift explanation suggests the craft was swinging toward the Earth just before it ducked behind the Moon, but it is difficult to imagine how this might be possible. Perhaps there is a more plausible solution involving diffraction around the edge of the Moon. Can anyone help with this?

In any event, other stations reporting Lunar Prospector signals included CT1DMK (5.6-meter dish and a receiver with 0.9 dB noise figure), K3PGP (4-meter dish) and JA4BLC (6-meter dish and a modified TV S-band converter). JA4BLC reported signals as late as January 22.

VHF/UHF/MICROWAVE NEWS New 24 GHz DX Record Set in France

F6BVA/p (JN02sv) and the team of F5CAU/p and FA1ONQ/p (JN33du) completed a 398-km 24-GHz contact on October 26, according to the RSGB *Microwave Newsletter* for December/January. This barely eclipsed the 397 km record held by DH6FAE/p and HB9MIN/p since 1993. The new contact, which linked mountaintop sites in the Pyrenees with the Alps, took place on a cool, dry day. Initial liaison was established on 144 MHz, and 10 GHz was used to align the antennas! F6BVA operated a DB6NT designed transverter, a 75-cm offset-feed dish and a 40 mW transmitter. F5CAU and FA1ONQ had a similar station, but it ran only 10 mW. The North American record on 24 GHz stands at 256 km, made in California in 1992.

South Africa on 70 MHz

The South African Telecommunications Regulatory Authority has assigned 70.000 to 70.0185 MHz to the South African Radio League (SARL) on a secondary basis for propagation studies, according to a recent announcement from SARL. ZS5MT/b is already running on 70.005 MHz from grid KG50ig, using 50 W and a horizontal turnstile antenna. SARL is accepting proposals from South African amateurs for other 70-MHz beacons. Apparently, this is a step preliminary to opening 70.0 to 70.3 MHz for general amateur use in South Africa, effective January 1, 2000.

North American operators may have some interesting opportunities once South African stations are on the air. The path between the eastern half of the US and South Africa is one of the easiest via F₂ propagation, and the MUF has reached that high on rare occasions. Europeans should also have an excellent opportunity to work South Africa on 70-MHz by transequatorial propagation, at least.

At present, the 4-meter band (70.0 to 70.5 MHz) is available only in the United Kingdom, Erie, Gibraltar and Cyprus (5B4). British 4-meter operators have been keen cross-band operators. They have made many 4 to 6-meter contacts throughout Europe, primarily via sporadic E. WA1OUB, W3EP and others have tried the cross-band route via sporadic E during the past three summers, but with no success so far. During the peak of Cycle 22, there was at least one cross-band contact between England and Nova Scotia via F₂. Perhaps Cycle 23 will provide some new opportunities for breakthroughs on 70 MHz.

FEEDBACK

No Code or Know Code?

February's "The Necessity of CW" discussion generated more letters and e-mail than nearly any other column of the past five years, all strongly supportive. Many thanks for the nice responses! Not all came from long-time VHFers, who were already convinced of the need for CW. Michael Moreland, KD5BBC, just got on 6 meters with 10 W to a triband vertical mounted on the roof of his apartment building, 25 feet above the ground. He reported his very first contacts during the January 16 opening, but observed that "if I had known the code, I could have snagged a couple of more."

He explained further: "I am a relatively new No-Code Tech that had viewed learning the code as just another chore that I would have to face if I wanted to upgrade. That is, until the past month when I got a taste of exactly what you were talking about in your February 1998 article on the necessity of CW. I didn't have to go to the HF bands to get the CW bug—I have found there are plenty of opportunities right here on 6 and 2 meters. Thanks for a great article, from a No-Code who is struggling to be a Know-Code!"

VHF/UHF and Repeaters: The Basics

The most popular amateur band is 2 meters, and the fastest-growing license class is Technician. It isn't surprising that frequency coordinators, ARRL officials and ARRL Headquarter staff members, receive many questions concerning Part 97 rules and regulations as they govern repeaters, including auxiliary stations, crossband linking, autopatch operation and the recently implemented RF exposure rules.

Everything amateurs need to know about applicable FCC rules can be found in Part 97, but the relevant "pieces" are scattered throughout Part 97. It's up to individual amateurs to apply the correct rules for particular systems.

Of course, it's difficult to understand the rules if you don't have them in front of you! *The FCC Rule Book*, published by the ARRL, includes almost 200 pages of interpretation material as well as a complete updated copy of Part 97. The most recent edition of *The FCC Rule Book* is the Tenth edition, third printing. It is available for \$12. ARRL publications are available from your local ARRL dealer or directly from the ARRL. Mail orders to Publication Sales Department, ARRL, 225 Main St, Newington, CT 06111-1494. You can order toll-free at 888-277-5289; fax your order to 860-594-0303; or send e-mail to pubsales@arrl.org. Check out the full ARRL publications line on the World Wide Web at <http://www.arrl.org/catalog>.

Q: How does the FCC define a "repeater"?

A: A repeater is "An amateur station which simultaneously retransmits the transmission of another amateur station on a different channel or channels [97.3(a)(37)]." Part 97 does state that "Limiting the use of a repeater to only certain users is permissible [97.205(e)]." The frequencies used by repeaters belong to the public, but the actual repeater is private property. Sometimes, a repeater is closed to eliminate intermod problems from nearby amateur and/or nonamateur stations.

Q: Where may repeaters operate?

A: All frequencies used by repeaters, including secondary inputs, "may receive and retransmit only on the 10 m and shorter wavelength frequency bands except 28.0-29.5 MHz, 50.0-51.0 MHz, 144.0-144.5 MHz, 145.5-146.0 MHz, 222.0-222.15 MHz, 431.0-433.0 MHz and 435.0-438.0 MHz segments [97.205(b)]." That's

why you never hear repeaters (including secondary inputs) on the HF bands (with the exception of the 29.5-29.7 MHz segment). The VHF and UHF exceptions protect weak signal and satellite segments that are highly susceptible to interference.

Q: Why do repeaters have different transmit and receive frequencies? Why can't they operate on one frequency?

A: Actually, they can. The FCC's amateur repeater rules were written with older analog voice systems in mind. These systems require separate frequency channels for transmit and receive, for technical reasons: the repeater's transmitted signal prevents it from hearing other signals on the same frequency, and in fact it takes careful engineering for a repeater to hear signals on a different frequency in the same band. A newer digital technique known as TDMA permits the use of the same frequency for both transmit and receive more than 100 times per second. How the FCC's rules might apply to amateur TDMA systems has not really been tested, but the FCC generally encourages amateurs to try new techniques.

Q: My dual-band H-T is capable of acting as a crossband repeater. Is this legal?

A: Yes, but even though it is a low-power device, it must conform to all repeater rules. You must "plug in" the necessary Part 97 rule sections including sections on auxiliary operation [97.3(a) and 97.201], control [97.3(a), 97.103, 97.105, 97.109] and telecommand [97.213]. Identification requirements also apply and you must be sure not to cause harmful interference to coordinated repeaters. Any time a permanent repeater is planned, the area frequency coordinator should be consulted to make sure that it won't cause interference to existing repeaters. Your frequency coordinator's name and address can be found in *The ARRL Repeater Directory*, or by contacting ARRL HQ.

Q: What's an auxiliary station?

A: An auxiliary station is "An amateur station, other than in a message forwarding system, that is transmitting communications point-to-point within a system of coordinating amateur stations [97.3(a)(7)]." It is essentially a closed system. Auxiliary stations, which usually control repeaters, may only transmit above 222.15 MHz ex-

cept in the 431-433 MHz and 435-438 MHz segments [97.201(b)]. All operators of the system must be authorized control operators who can implement all control commands. An average user wouldn't have access to these commands. For a detailed look at the many uses of auxiliary stations in linked systems, see *QST* Apr 1996, page 108.

Q: What's "telecommand"?

A: FCC defines telecommand as "A one-way transmission to initiate, modify, or terminate functions of a device at a distance [97.3(a)(39)]." A repeater must have a radio or wireline link between the control point and the station so that the control operator can perform his or her duties. If radio is used, the control link must use an auxiliary station [97.213(a)]. Radio and telephone links can fail, so the FCC requires that transmissions be limited to three minutes in the event of a malfunction of the control link [97.213(b)]. That's why time-out timers are used on repeaters.

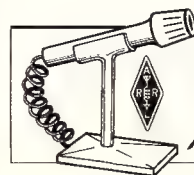
Q: Can I use my H-T to remotely control my 2-meter home station, thereby extending the range of my H-T?

A: Sure, but an auxiliary station must be used. Don't forget to identify all links.

Q: Why can't I access the autopatch of my local repeater at night?

A: Repeaters can be controlled automatically, however, FCC rules state that "No station may be automatically controlled while transmitting third-party communications. [97.109(e)]." An autopatch must be remotely (or locally) controlled and there must be a designated control operator present. Many repeater controllers have a "day mode" and a "night mode." When the "day mode" is activated, a designated repeater control operator is present. When the "night mode" is "up," a control operator is not always available. Remember that each amateur is the control operator of his or her own station, but not necessarily of the repeater station.

QST



Talk UP
Amateur Radio!

VE3CJ Memorial Station Dedicated

Few volunteers have served organized Amateur Radio with greater distinction than the late Noel B. Eaton, VE3CJ. First licensed in 1937, he was an active amateur who kept in touch with a host of friends on the air



Noel B. Eaton, VE3CJ

and often operated from the Cayman Islands as VP5BP. In World War II he served as a Wing Commander in the Royal Canadian Air Force. In 1959, shortly after retiring from managing his own business in Hamilton, Ontario, Noel ran successfully for the office of Vice Director of the Canadian Division of the ARRL and assumed the office on New Year's Day 1960. (The Canadian Division of the ARRL later became autonomous as the Canadian Radio Relay League and subsequently merged with the Canadian Amateur Radio Federation to become today's Radio Amateurs of Canada.)

Noel did not remain a vice director for long. Just five months later, the ARRL Board elected Alex Reid, VE2BE, as a vice president and Noel succeeded him as Canadian Director. He remained in that office until 1974, when he himself was elected an ARRL vice president. In 1980 Noel became the first person to hold the position of ARRL International Affairs Vice President.

As great as were his contributions as the ARRL representative of Canadian amateurs, Noel's greater legacy is in the international arena. In 1964 he helped organize the regional association of IARU member-societies in the Americas, now known as IARU Region 2, and served as its Treasurer for the first decade of its existence. In 1974 he became President of the International Amateur Radio Union and the first IARU officer from outside the United States. In this capacity he guided the IARU through the challenging years leading up to the 1979 World Administrative Radio Conference and headed the successful IARU team that spent three months at the conference in Geneva that year. Noel retired as IARU President and ARRL International Affairs Vice President in 1982, but not before laying the groundwork for a revision of the IARU Constitution to recognize the importance of the IARU regional organizations, the second of which he himself had helped to create. The following year Noel was elected IARU President Emeritus, the

position that he held at his death on September 28, 1996 at the age of 86.

Noel Eaton is gone, but he will not be forgotten. His friends are seeing to that.

Here in Newington, the office where the work of the IARU International Secretariat is performed is graced by the portrait of Noel that is reproduced on this page. The portrait was donated last year by Fred Hammond, VE3HC.

Even better, the call sign VE3CJ has returned to the air.

IARU President Richard L. Baldwin, W1RU, reports: "On February 21, 1998, the Noel B. Eaton Memorial Station, VE3CJ, was opened at the Royal Canadian Legion Hall in Burlington, Ontario, in a ceremony organized by the Burlington Amateur Radio Club (BARC). On Saturday morning there was a well-attended flea market, and in the evening a banquet and opening ceremonies. It was a first-class affair, ably organized by the BARC and attended by nearly 150 amateurs from various sections of Canada. The speakers, in the following order, included His Excellency Samir Khalifeh, Jordanian Ambassador, representing His Majesty Hussein I, JY1; Paddy Torsney, MP; Cam Jackson, MPP; Joyce Savoline, Chair, Region of Halton; Rob MacIsaac, Mayor, City of Burlington; Chuck Cumberland, President, Royal Canadian Legion, Branch 60; J. Farrell Hopwood, VE7RD, President, Radio Amateurs of Canada; Daniel Lamoureux, VE2ZDL, President, Radio Amateur du Quebec Inc; Hugh Turnbull, W3ABC, Vice President, ARRL; Wm. F. (Sandy) Leishman, nephew of Noel; Moire Fee, a member of Noel's Number Six Group Bomber Command, RCAF (she came up from Florida just for the occasion); Fred Hammond, VE3HC; IARU Region 2 President Tom Atkins, VE3CDM; and W1RU.

"The recurrent theme in the presentations was the high regard that everyone had for Noel, and included tributes not only to his service as IARU President but also to his many years as a director and officer of the ARRL when Canada was one of the 16 divisions.

"The station is located in a large room on the ground floor of the Legion hall. There are two operating positions, both using equipment from Noel's shack, plus a tower and HF antennas. The spacious walls of the room are covered with photos, awards, plaques, banners, and other memorabilia that Noel had accumulated over the years.

"In every detail, it was an outstanding weekend."

ARRL Vice President Hugh Turnbull, W3ABC, represented the ARRL members, Board, and staff. He adds, "The well-attended Memorial Station dedication on Saturday was a wonderful tribute to an outstanding radio amateur and personal friend. I am glad to have had the opportunity to represent the League and to renew some friendships made at past IARU meetings."

WORLD TELECOMMUNICATION DAY, MAY 17

Each year, the International Telecommunication Union marks the anniversary of the founding of its earliest predecessor organization, in 1865 in Paris, by designating May 17 as World Telecommunication Day. Traditionally, radio amateurs have been among the most enthusiastic observers of the occasion.

The theme of this year's World Telecommunication Day is "Trade in Telecommunications." In his message announcing the theme, ITU Secretary-General Pekka Tarjanne notes how telecommunications has "transformed itself from a sector dominated by largely state-run monopoly providers, operating within closed, local markets, to a liberalized market, where private and public operators compete freely with one another, offering a wide range of services to customers around the world." He continues, "The winds of change now sweeping through the world of telecommunications are necessary for the development of a truly global economy, in which all countries can participate as equal partners."

"The development of the Internet over the last three years or so is an excellent example of what can be achieved in a free market. This system, based on a network of networks spanning the globe, has grown in just three short years from an exclusive domain for the computer-literate to a mainstream marketing and sales tool used by hundreds of thousands of businesses world-wide.

"Like the fax before it, the Internet has made itself so indispensable that it is now hard to imagine life before it existed. But it is unlikely indeed that such a system could have evolved from within a government-run or large private enterprise. Freedom and competition have been the key to the Internet's development, and I hope to see the development of many more, equally useful tools as a result of global telecoms liberalization."

IARU TURNS 73

This month we have the opportunity to send "73" to the International Amateur Radio Union. It was 73 years ago this month, on April 18, 1925, that the IARU was founded in Paris. There were representatives of 25 countries at the final session of the organizing Congress. Today the IARU has grown to 146 active member-societies in as many countries and separate territories, with applications from two additional countries now being processed.

Happy birthday, IARU!

QST

Satellites in Orlando

On February 13 about 32 satellite enthusiasts—and enthusiasts to be—gathered in a small building at the Orlando Hamcation to dispel some myths. The myths are that (a) satellites are difficult to work and (b) setting up a satellite station is hideously expensive. For five hours we explored everything from OSCAR 27 to Phase 3D. The list of speakers included Barry Baines, WD4ASW; Steve Bible, N7HPR; Dick Jansson, WD4FAB; Keith Pugh, W5IU, and me.

Dan Miller, K3UFG, of the Headquarters Educational Activities Department, made the opening introductions. Among the guests in attendance, however, Dan failed to mention the *termites*. The winged denizens above the ceiling panels chose the beginning of our workshop to swarm by the hundreds. Barry Baines carried on as termites crawled across the overhead project plate and used the AMSAT literature table as an aircraft carrier. (We had to move the table twice!) Hamcation officials quickly sent over a man with a container of insecticide and the problem was put to rest.

With the insect invasion under control, the workshop continued smoothly. After Barry's introduction, I expounded on the joys of operating through AO-27, RS-12, FO-20 and other "EasySats." Steve Bible took the helm (appropriate to his occupation as a submariner) and addressed the digital satellites. Dick Jansson and Keith Pugh rounded out the session with a discussion of Phase 3D. The enthusiastic "students" went home with plenty of information and even some satellite-tracking software.

If you ever get a chance to attend one of these workshops, don't pass up the opportunity. It wasn't just a learning experience; the camaraderie and enjoyment were more than worth the price of admission. (I love to exploit my history of bumbling inexperience for comedy, and it never fails.) I hope we'll be hearing more new call signs on the air as a result.

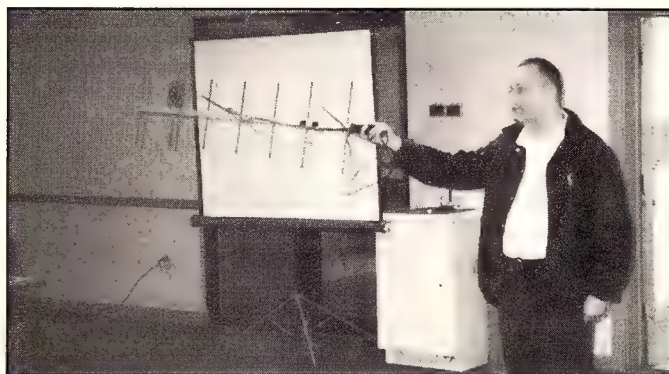
Visiting Phase 3D

While I was in Orlando, Stan Wood, WA4NFY, treated me to a tour of the Phase 3D integration facility. If you've been

following the progress of the satellite, you'll be pleased to know that it was about 90% complete at the time this column went to press (late February). By the time you read this, the figure will be closer to 100%.

Beyond the technical beauty of the satellite itself, what impressed me the most during my tour was the clever resourcefulness of the AMSAT Phase 3D team. To keep the costs somewhere below the upper stratosphere, they've manufactured such things as spin balances and sun-sensor alignment jigs with their bare hands. In the best ham tradition, they also "shopped smart," getting donated gear and components whenever possible, or at least procuring components at bargain prices. Take the fuel tanks as examples. Lockheed offered to manufacture the entire set for a jaw-dropping \$500,000. The Phase 3D team turned to a reliable Russian source instead—and obtained the complete set for \$25,000. Such a deal!

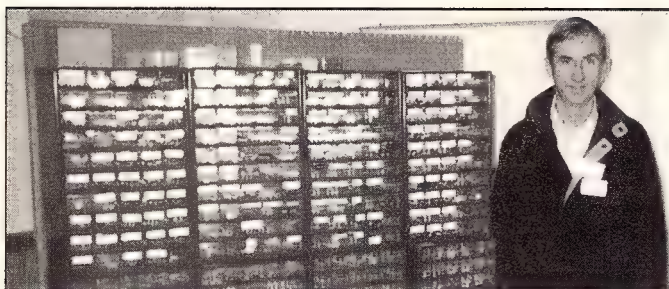
The team is hoping to have Phase 3D buttoned up and ready for environmental testing within the next 60 days. Let's keep our fingers crossed for a ride to orbit this year!



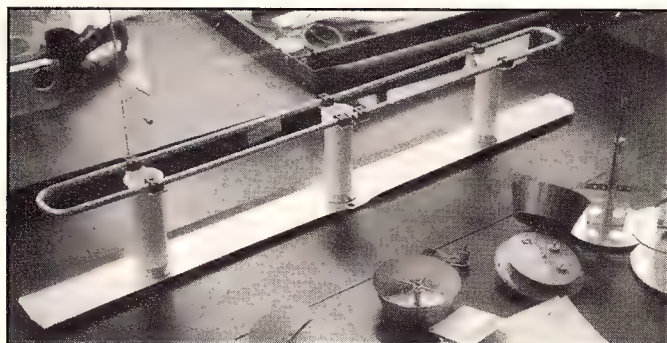
At the Orlando satellite workshop, Barry Baines, WD4ASW, demonstrates a 2-meter/70-cm "arrow" beam antenna used to work AO-27.



Lou McFadin, W5DID, and the Phase 3D satellite. The bird is 90% complete and almost good to go!



Stan Wood, WA4NFY, shows off the Phase 3D integration team's "parts junkbox." Some of these backup components date all the way back to the days of OSCAR 10's construction, but they're still perfectly useable for Phase 3D.



Phase 3D's 2-meter antenna—finished and ready for installation.

QST

Edited by **Diane P. Ortiz, K2DO***

The signs of spring are finally under-way and with them come changes to the YLRL Web site. Its new URL is <http://home.earthlink.net/~tenmtryl/ylrl/>.

We also have sad news to report. A former editor of this column, Jean Peacor, K1IJV, of Orleans, Massachusetts, became a Silent Key January 10 at the age of 70. Her columns ran from July 1963 to October 1966 and again from July 1979 through August 1985. She was active in the West Massachusetts Net and was an avid bridge player. We are all saddened by her passing, and recognize her many years of dedicated service to the ham radio community.

Have you ever wondered what it would be like to be part of a DXpedition to an exotic island? To meet up with hams from all over the globe who are strangers to you, spend 12 days and nights living in tents and being on the other end of a DX pileup? One American YL recently found out.

When I heard that Ann Santos, WA1S, was participating in an upcoming DXpedition to Willis Island (off the coast of north-eastern Australia), I immediately contacted her. I had many questions about every facet of her trip. How did she find out about it? How did her family react? How did she get

time off from work? Was it very expensive? Did she have to have certain technical qualifications? How did she choose what type of clothing to bring? Where was she going to stay and what were the facilities going to be like?

Ann kept a journal of her trip and what follows is an edited log of her experiences, including personal glimpses into the fun and hardships of a DXpedition from a YL point of view. Ann is a YLRL and YCCC (Yankee Clipper Contest Club) member who is an active CW operator and contesteer from her home in New Hampshire as well as from other contest stations.

Willis Island DXpedition— September 1997

By Ann M. Santos, WA1S
(edited by Diane Ortiz, K2DO)

About 2½ years ago I read a small ad in *QRZ DX* looking for YL operators to go on a DXpedition. They said to write them if you were interested and include a profile. I have always wanted to travel the world and this was my chance to start. I wrote them, and it wasn't long before I received a reply that I was going to be part of a future trip. There was no definite destination, but the possibilities included Christmas Island, Cocos Keeling or Auckland Island.

After that, nothing materialized until I received a call in April 1996 asking if I could go to Christmas Island in May. One month was not enough notice! Not only did I need time to arrange the days off from work, but it was also the same time as the Dayton Hamvention. I had to pass on this trip, hoping there would be another.

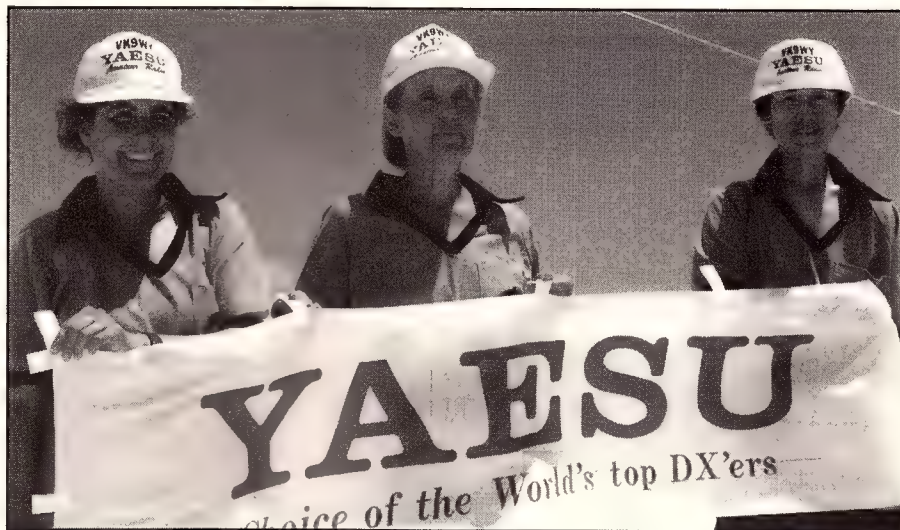
I was contacted again in early 1997 with the possibility of a trip in August or September of that year. There was enough time to make the arrangements for the days off from work and it wasn't long before things started coming together.

The Destination

Willis Island sits at 16° 12.4' south, 149° 59.8' east. It's approximately ½ mile in circumference and at its highest point is about 15 feet above sea level. It is inhabited by thousands of birds (boobies and terns) and hermit crabs and is surrounded by a coral reef. Passage to the island is only possible during low tide in a small boat or dinghy through a very narrow passage.

Getting Ready and Getting There

I spent a lot of time choosing multi-purpose, comfortable clothing that didn't take up a lot of luggage space. The climate is very hot! My share of the expenses was reasonable (approximately \$2000 plus airfare) and I was able to use vacation



The YL contingent of the Willis Island DXpedition. From left to right, Ann, WA1S; Elvira, IV3FSG; Noriko, 7K3EOP.

time accrued during my full-time job with the FAA. So far, so good.

My flight departed Saturday, September 6, from Boston's Logan International Airport for the first leg of the journey, a 6-hour trip to Los Angeles. After a few hours layover I boarded the 14-hour Qantas flight to Sydney, Australia, and tried to get some sleep. Unfortunately, I had a screaming child in proximity, so sleep was impossible. We were served three meals and shown three movies—I thought the flight would never end!

We finally arrived in Sydney around 0600 UTC and proceeded to a 3-hour connecting flight to Cairns (on the northeastern coast of Australia). As I exited Customs in Cairns I was greeted by some of the other members of the team, Bill Horner, VK4FW; Bill Snider, K6KM; Bob Dixon, VK4MR; and Darryl Hazelgren, AF7O. We loaded the luggage in the car and headed for the Acacia Court Hotel where I met Noriko Tokura, 7K3EOP, and Elvira Simoncini, IV3FSG, the other two YLs on the DXpedition.

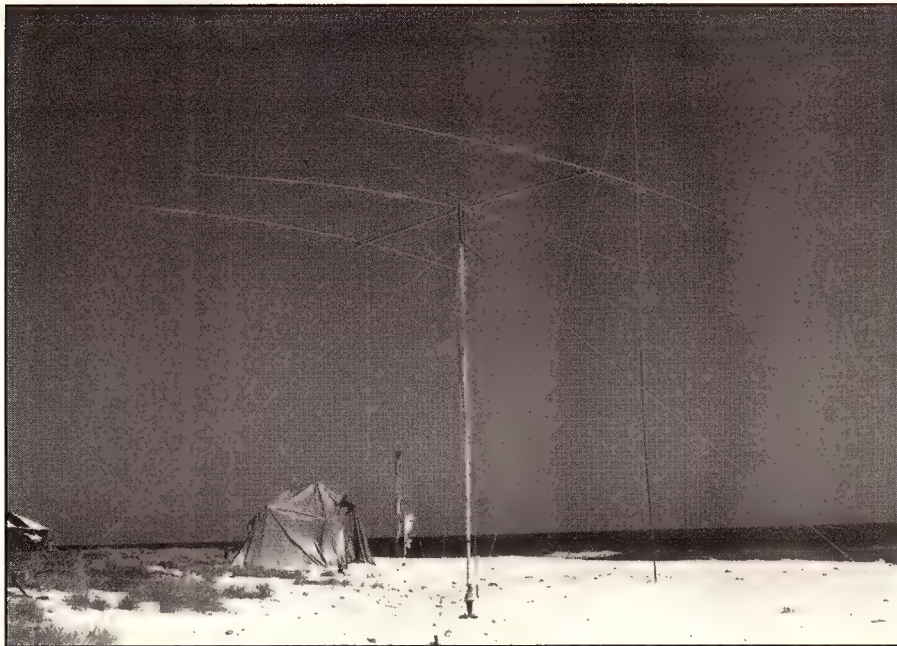
The next few days of our journey were going to be on the *Floreat*, a 62-foot vessel. Captain Marcus gave us the grand tour and we saw that the boat had some age, but was in excellent condition and had the latest in navigation equipment. We loaded *Floreat* with antennas, Yaesu FT1000MP transceivers, FL7000 amps, more Yaesu gear, power supplies, generators, tents, food, more food, and, finally, our baggage.

We made a quick trip downtown to the Australian Communications office to apply for our VK4 licenses, which were processed on the spot. We didn't request special call signs so it was a surprise when I got the call VK4AMS—my initials! To celebrate, we went to the harbor and feasted at an all-you-can-eat buffet. As the evening came to an end we went back to the *Floreat* for the night.

September 9

A beautiful sunrise over the harbor greeted us as we began our busy day picking up the rental equipment (generators, tents, tables and chairs)

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The Willis Island DXpedition established itself on Mid Cay's windswept beach. The 20-meter "monster" monoband Yagi is in the foreground.

and loading it onto the boat. With the arrival of Doug Renwick, VE5RA; Vlad, VK2AEA; Eric Esposito, FK8GM; Gordon (the captain's father) and Pat (the cook), we finally had everyone on board and were ready to depart on our journey. Our first stop would be Holmes Reef, about halfway between Cairns and Willis Island, to see whether we would be able to operate from there.

Rough Waters

After a few hours sleep I awoke to choppy seas and staggered my way to the captain's cabin. I was dismayed to discover that we were less than halfway to Holmes Reef and many of us were seasick. Bill, Noriko, Elvira and Darryl were hit pretty hard. Doug was also sick, but he knew what to expect from his DXpedition to Kingman Reef and came prepared with medication to ease the symptoms. Remarkably, Bill, K6KM; Bob, VK4MR; and I did not get seasick. When I was young I spent a lot of time on the Chesapeake Bay and had been on heavier seas than what we were experiencing. I knew that being out in the middle of a large body of open water like the Coral Sea, we could expect almost anything.

On the way, we crossed over an underwater mountain that came within 40 meters of the surface. Captain Marcus said this was a great fishing spot and, to prove it, he slowed the boat and threw out a fishing line with an orange lure and treble hook. In just a few minutes he pulled in a 20-kg wahoo (*acanthocybium solandrii*—in the mackerel family)!

We arrived at Holmes Reef around noon local time where we anchored and ate lunch. The water was a bit calmer here because the reef protected us. We wanted to activate it as a new Island On The Air, but as the tide rose we discovered that sandy Holmes Reef would soon disappear into the water! We decided to add a day to our stay on Willis instead and departed.

As night fell, the winds picked up in excess of 20 kph. Noriko felt seasick and went back and forth from the main cabin to the deck outside to get some fresh air. The sea spray outside was strong and her clothing became very wet, adding to her misery. Elvira and Darryl also felt ill, but remained in the main cabin. It was almost midnight and our

expected arrival at Main Island, Willis Island was around 8 AM the next morning.

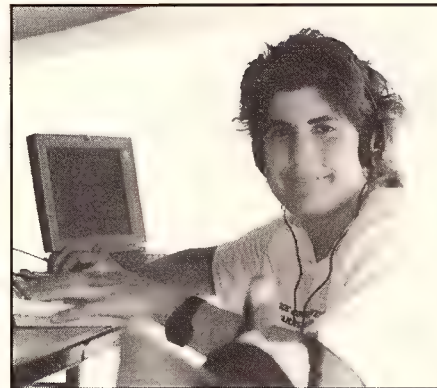
Arrival!

On Thursday, September 11, at 8:30 AM we arrived at Main Island, Willis, approximately 350 km east of Cairns, Australia. A few of us volunteered to visit the island and deliver some boxes of supplies to the four residents living at the weather observatory there. They stay for six months at a time and then are replaced by another group. They were glad to see us as they have few visitors. The island was full of large booby birds that nested in small trees barely large enough to support their weight. The birds didn't seem to mind visitors and we were able to get relatively close to them and take photos. We soon left for North Cay Island where we planned to set up our camp site and antenna farm.

The trip to North Cay took more than an hour as Captain Marcus gingerly maneuvered the *Floreat* to within 500 yards of the island. He couldn't get closer because of a large, shallow barrier reef. We thought that was too far to transport all our equipment by dinghy, so we decided to set up camp on nearby Mid Cay instead. We had passed it earlier and it looked like we would be able to land there.

As its name suggests, Mid Cay is located about midway between Main Island Willis and North Cay. We were able to get much nearer to Mid Cay, and it was also higher above sea level than North Cay. There was a passageway through the reef just large enough for the dinghy to make it to the shore. It was mid afternoon now and we only had a few hours of sunlight left. We sent the seasick people ashore first—Elvira, Darryl, Doug and Noriko—while the rest of us prepared to transport the emergency rations and a large tent. Bill, VK4FW, Eric, and Vlad also went ashore. Bill, K6KM, and I stayed on the *Floreat* to assist with loading the dinghy with more supplies. From onboard the *Floreat* we could see that the shore party was struggling to set up the tent in the wind. They also tried to raise one of the antennas, but time flew by and it was getting dark.

Bill, K6KM, joined the shore party while Bob and I stayed behind on the *Floreat*. No one else wanted to spend another minute on the boat



Ann, WA1S, takes a brief break from running pileups on 20 meters.

besides the two of us and the crew, so I was able to take a refreshing shower and then enjoy a dinner of spaghetti, salad and garlic bread. In the distance we could see a spot of light from the shore party. Satisfied that all was well, we called it a night. There was still lots of stuff to bring to the island and tomorrow would be a long day.

Up and Running

September 12 dawned spectacularly. Refreshed by a good night's sleep, I went ashore and helped haul the equipment from the beach to the tent area that was to be our sleeping and cooking/eating quarters. My next job was the assembly of the Cushcraft A3SDX antenna. This antenna was designed specifically for DXpeditions and was packed in two boxes small enough to check as luggage on a plane. It went together pretty easily.

Noriko was the first to give the A3SDX a try with a Yaesu FT1000MP transceiver and an FL7000 amp. (Yaesu was our main sponsor for the DXpedition and supplied us with radios and amplifiers at a substantial discount.) Noriko immediately created a pileup of JAs so we knew the antenna worked.

I started assembling the 20-meter monoband beam made in Australia. When I opened the box there were no instructions! Time to improvise. Many of the pieces were marked, so I thought it couldn't be that difficult. As I reached the final stages, I found that the pieces of aluminum on the ends of the elements would not go in far enough to align with the screw holes. I tried pulling the pieces apart but had no luck. Doug and Eric tried pulling and twisting them apart but they had little success, either. Bill, VK4FW, said to just put it back in the box and forget it, but I wasn't quite ready to give up. I set it aside for later.

After lunch I decided to give the 20-meter monobander another try, determined to get it together. I improvised by using a hacksaw to cut off the excess length that would not slide any further. I finally got all the elements together, but I wasn't sure how the matching section was supposed to be assembled. Doug, VE5RA, gave me a hand and it worked!

Soon it was my chance to operate. I started on 20-meter CW with the A3SDX and immediately created a JA pileup. I've always enjoyed JA pileups because from my home on the East Coast of the US, openings to Asia are very short. In four hours I managed 470 contacts, mostly JAs. There wasn't much propagation stateside except for a few W6s and W7s. At 2130 UTC, Elvira took over the station to operate a bit of RTTY while I went to the main tent to rest. It started to rain and my sleeping bag became wet. I tried moving to a drier location but soon the wind picked up and the large tent started to buckle.

—to be continued!

33, Diane

Coming Conventions

Edited by **Gail Iannone** • Convention Program Manager

SOUTHEASTERN DIVISION CONVENTION

April 18-19, 1998, Birmingham, AL

The Southeastern Division Convention, sponsored by the Birmingham ARC, will be held at the Birmingham-Jefferson Convention Center in downtown Birmingham, 22nd St Exit off I-59/20. Features include flea market (Walter Cooney, KF4AAG, 205-823-8249; walterroy@aol.com), booths (Eddie Oliver, KD4BWW, 205-956-9636; kd4bww@usa.net), forums, banquet (Saturday eve), VE sessions (Sunday). Talk-in on 146.88. Admission is \$6, under 12 accompanied by an adult is free. Contact Ellis Dobbins, K4LI, 205-798-3459; k4li@scott.net or barc@bro.net; <http://bro.net/barc/fest.html>.

ARKANSAS STATE CONVENTION

April 24-25, 1998, Little Rock

The Arkansas State Convention, sponsored by the Arkansas Radio Emergency Service and other central Arkansas ARCs, will be held at the Little Rock Expo Center, Exit 126 off I-30. Doors are open Friday 4-9 PM, Saturday 8 AM to 5 PM. Features include flea market, dealers, tailgating, exhibitors (military, OES, mobile emergency communications vehicles, antique amateur radio show), forums, packet and packet conference, amateur television, satellite, technical table, homebuilder contest, foxhunts, Wouff-Hong ceremony (Friday night at midnight), NWS, ARES/RACES, MARS, CW contests, QLF contest, handicapped accessible, plenty of parking. Talk-in on 146.85. Admission is \$7. Contact Jim Blackmon, K5VZ, 1008 Pine St, Arkadelphia, AR 71923-4919, 870-246-7833 or 870-246-6734; lrhamfest@usa.net; <http://www.aristotle.net/~n5xy/lrh98.html>.

DELAWARE STATE CONVENTION

April 26, 1998, New Castle

The Delaware State Convention, sponsored by the Penn-Del ARC, will be held at the Nur Temple on Rte 13 N, 1/4 mi N of the intersection of Rtes 13 and 40. Doors are open for setup 6 AM; public 9 AM to 3 PM. Features include vendors, tailgating (\$10 per

1998

March 28-29

Maryland State, Timonium*

April 3-4

Southeastern VHF Conference, Atlanta, GA*

April 5

North Carolina State, Raleigh*

May 29-30

Midwest/Dakota Division, South Sioux City, NE

May 29-31

Atlantic Division/New York State, Rochester

May 29-31

Northwestern Division, Seaside, OR

* See March *QST* for details.

space; first-come, first-served basis), certified SKYWARN spotter training class, ARRL forum, club leader's meeting, seminar on the new FCC RF exposure regulations by special guest speaker Ed Hare, W1RF1, from ARRL Headquarters, refreshments. Talk-in on 147.225, 224.22. Admission is \$5, under 12 free. Tables are \$15 with electricity, \$10 without electricity (by reservation only with payment to Penn-Del Hamfest '98, Box 1964, Boothwyn, PA 19061). Contact Hal Frantz, KA3TWG, 302-793-1080; hfrantz@magpage.com; <http://www.magpage.com/pennndel>.

DELTA DIVISION CONVENTION

May 1-2, 1998, Baton Rouge, LA

The Delta Division Convention, sponsored by the Baton Rouge ARC, will be held at The Great Hall, Bellemont Hotel, 7370 Airline Hwy (US 61), approximately 4 mi N of I-12. Doors are open Friday 5-9 PM, Saturday 8 AM to 4 PM. Features include Hamfest and Computer Show, technical and computer forums, VE sessions. Talk-in on 146.79, 146.88. Admission is \$4 in advance, \$5 at the door. Contact Herb Ramey, W5LSU, Box 68, Greenwell

Springs, LA 70739, 504-654-6087 or 800-256-FEST; w5gix@aol.com.

INTERNATIONAL DX CONVENTION

May 1-3, 1998, Visalia, CA

The International DX Convention, sponsored by the Southern California DX Club, will be held at the Holiday Inn. Features include all HF, low-band and DX oriented forums and technical sessions; hosted cocktail party; banquet dinner and DX-oriented program (Saturday eve); breakfast buffet (Sunday morning); special well-known guest speakers; QSL card checking. Admission is \$55 in advance (by Apr 15), \$60 at the door. Make checks payable to "International DX Convention" and send to Don Bostrom, N6IC, 4447 Atoll Ave, Sherman Oaks, CA 91423; 818-784-2590; or contact Rick Samoian, W6SR, 714-993-0713 or 310-616-3912.

Attention Hamfest and Convention Sponsors:

ARRL HQ maintains a date register of scheduled events that may assist you in picking a suitable date for your event. You're encouraged to register your event with HQ as far in advance as your planning permits. Hamfest and convention approval procedures for ARRL sanction are separate and distinct from the date register. Registering dates with ARRL HQ doesn't constitute League sanction, nor does it guarantee there will not be a conflict with another established event in the same area.

We at ARRL HQ are not able to approve dates for sanctioned hamfests and conventions. For hamfests, this must be done by your division director. For conventions, approval must be made by your director and by the executive committee. Application forms can be obtained by writing to or calling the ARRL convention program manager, tel 860-594-0262.

Note: Sponsors of large gatherings should check with League HQ for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL HQ for up to two years in advance.

QST

Hamfest Calendar

Edited by **Gail Iannone** • Convention Program Manager

Attention: The deadline for receipt of items for this column is the **1st of the second month preceding publication date**. For example, your information must arrive at HQ by **April 1** to be listed in the **June** issue. Hamfest information is accurate as of our deadline; contact sponsor for possible late changes. For those who send in items for Hamfest Calendar and Coming Conventions: Postal regulations prohibit mention in *QST* of prizes or any kind of games of chance such as raffles or bingo.

(Abbreviations: *Spr* = Sponsor, *TI* = Talk-in frequency, *Adm* = Admission.)

Alabama (Birmingham)—Apr 18-19, Southeastern Division Convention. See "Coming Conventions."

†ARRL Hamfest

†**Arizona (Phoenix)—Apr 18**, 6 AM to 2 PM. *Spr*: Arizona ARC, DeVry Technical Institute, 2149 W Dunlap Ave, South parking lot; I-17 to Dunlap Ave, go E approx 1 mi, follow signs. Tailgating (\$5 per space), commercial vendors. *TI*: 147.28. *Adm*: \$1. George Cooney, KQ7C, 21 E Colter St, Phoenix, AZ 85012, 602-274-6212; georgie@aztec.asu.edu.

†**Arizona (Sierra Vista)—May 2**, 6 AM to 5 PM. *Spr*: Cochise ARA, SE AZ Radio Society, ARCA. Cochise College Campus, 901 N Colombo Ave. Exhibits, meetings, MARS, RACES, packet radio, VE sessions. *TI*: 147.02 (162.2 Hz), 146.76 (162.2 Hz), 449.525 (100 Hz), 146.52. Ronald Slominski, KC7QXJ, 3701 E Yokut St, Sierra Vista, AZ 85635; 520-378-3018.

Arkansas (Bentonville)—Apr 11. BCRO, Box 883, Pea Ridge, AR 72751.

Arkansas (Little Rock)—Apr 24-25, Arkansas State Convention. See "Coming Conventions."

California (Livermore)—Apr 5. Noel Anklam, KC6QZK, 510-447-3857.

California (Sacramento)—Apr 18. Roy Rudebaugh, KD6LLE, 916-427-6852.

†**California (Sonoma)—Apr 25**; set up 7 AM; public 8 AM to noon. *Spr*: Valley of the Moon ARC. Sonoma Valley Veteran's Memorial Building, 126 First St W, 1 block N of the central Sonoma Plaza, Hwy 12. Electronics swapmeet, VE sessions (walk-ins register 9 AM, exams 10 AM, all license elements), forums, operating QRP station, display of homebuilt equipment, beginner's DF hunt, refreshments. *TI*: 145.35 (88.5 Hz). *Adm*: Free. Darrell Jones, WD6BOR, 358 Patten St, Sonoma, CA 95476; 707-996-4494.

California (Visalia)—May 1-3, International DX Convention. See "Coming Conventions."

†**Colorado (Colorado Springs)—May 2**; set up 6 AM; public 8 AM to 2 PM. *Spr*: Pikes Peak RAA.

Doherty High School, 4515 Barnes Rd; I-25 to Exit 146, go E on Garden of the Gods Rd (changes to Austin Bluffs Pkwy), 4 1/2 mi, turn right onto Barnes Rd. VE sessions (10 AM). *TI:* 146.97 (100 Hz), 146.52. *Adm:* \$4, under 12 free. Tables: first \$12, additional \$10. Phil Pearsall, KC5LXC, 719-531-5319; pearsall@msn.com.

†**Colorado (Grand Junction)**—May 9, 8 AM to 2 PM. *Spr:* Western Colorado ARC. National Guard Armory, 482 28th Rd; from Denver take Clifton Exit (becomes I-70 Business Loop). Hamfest/Computer Fair, vendors, VE sessions (10 AM, all classes), refreshments. *TI:* 146.94. *Adm:* \$3. Tables: \$10. Diana Dodd, KB0REW, 507 Liberty Cap Ct, Grand Junction, CO 81503; 970-243-7441.

Colorado (Longmont)—Apr 4. Fred Pilz, KB0UUD, 303-678-5830.

Connecticut (Bristol)—Mar 22. Pete Brunelli, N1QDQ, 860-620-0176.

Delaware (New Castle)—Apr 26. Delaware State Convention. See "Coming Conventions."

†**Florida (Gainesville)**—Apr 24-25; set up Friday noon to 4 PM, Saturday 6 AM; public Friday 4 PM, Saturday 8 AM. *Spr:* Gainesville ARS. Alachua County Fairgrounds, Rte 24 at Rte 222. Hamfest/Computer Show, tailgating (\$6), VE sessions (Saturday 10 AM, all classes, \$5), overnight camping (Friday and Saturday, \$10 per night), free parking, refreshments. *TI:* 146.82. *Adm:* \$5. Tables: \$7. Larry Walker, WB4VAU, 4003 NW 14th St, Gainesville, FL 32605; 352-377-0683.

Florida (Miami)—Apr 11. Walt Dixon, W4DWN, 305-895-0398.

†**Georgia (Warner Robins)**—Apr 18, 9 AM to 3 PM. *Spr:* Central Georgia ARC. Warner Robins Jaycee's Building. VE sessions. *TI:* 146.85. *Adm:* \$5. Dennis Ryckman, KF4LTH, 1432 Dunbar Rd, Lot 187, Byron, GA 31008; 912-956-1665.

†**Illinois (Arthur)**—Apr 26, 8 AM to 1 PM. *Spr:* Moultrie ARK. Moultrie/Douglas County Fairgrounds, S side of Arthur, off Rte 133, behind High School. Forum tent with various subjects every hour. *TI:* 146.655, 444.275. *Adm:* \$4, over age 14. Tables: \$10 (paid in advance, MARK, Box 91, Lovington, IL 61937). Ralph Zancha, WC9V, Box 55, Lovington, IL 61937; 217-543-2178 days or 217-873-5287 eves.

Illinois (Kewanee)—Apr 26. Bill Anderson, WB9TEW, 309-932-3023.

Illinois (Sandwich)—May 3. Bob Yurs, W9ICU, 815-895-3219.

†**Illinois (Stickney)**—Apr 19; set up Saturday 3-6 PM, Sunday 6 AM; public 8 AM to 2 PM. *Spr:* DuPage ARC. Hawthorne Race Course, 3500 S Cicero Ave, 3 blocks N of I-55. Hamfest/Computer Show, free outdoor flea market (weather permitting), commercial dealers, equipment, electronics, exhibits, VE sessions (9 AM), handicapped accessible, free parking, refreshments. *TI:* 145.25 (107.2 Hz). *Adm:* advance \$4, door \$5, under 12 free. Ed Weinstein, WD9AYR, 7511 Walnut Ave, Woodridge, IL 60517-2818, 630-985-9256; edwinwein@aol.com; <http://homepage.interaccess.com/~geirh/>.

Indiana (Michigan City)—Mar 28. Ron Stahoviak, N9TPC, 219-325-9089.

†**Iowa (Des Moines)**—Apr 25; set up Friday 7-10 PM, Saturday 6-8 AM; public 8 AM to 1 PM. *Spr:* Des Moines RAA. Iowa State Fairgrounds Tourism Building. Vendors, free outside tailgate area, forums, VE sessions (10 AM), refreshments. *TI:* 146.94. *Adm:* \$5, under 12 free. Tables: first \$15 (includes 1 admission), additional \$10 each. Write DMRAA, Box 88, Des Moines, IA 50301; or call Ron Hobbs, N0XWI, 515-255-4020; rwhobbs@aol.com.

†**Kentucky (Owensboro)**—May 2; set up Friday 7 PM, Saturday 6:30 AM; public 8 AM to 2 PM. *Spr:* Owensboro ARC. Sportscenter, 1215 Hickman Ave. Flea market, commercial vendors (advance reservations required), tailgating, forums, VE sessions, surplus auction at close of hamfest, refreshments. *TI:* 147.21, 146.865. *Adm:* \$5. Tables: \$7, commercial \$25. George Stokes, KD4CKT, 1218 W 3rd St, Owensboro, KY 42301, 502-683-2169, fax 502-684-2433; w4nho@occ.uky-campus.mci.net.

Louisiana (Baton Rouge)—May 1-2. Delta Division Convention. See "Coming Conventions."

†**Maryland (Grasonville)**—May 2, 8 AM to 2 PM. *Spr:* Anne Arundel RC and Kent Island ARC. VFW Grounds, Rte 50/301, E of Kent Narrows Bridge, Exit 44, VFW Ave. Hamfest/Computerfest, VE sessions, refreshments. *TI:* 146.94, 147.105. *Adm:* \$4. Tables: \$4. Glenn Durbin, WN3G, 111 Indian Plantation Dr, Stevensville, MD 21666, 410-643-1125; pvtptilot@friend.ly.net.

†**Maryland (Hagerstown)**—May 3; set up Saturday 6-9 PM; public Sunday 8 AM to 3 PM. *Spr:* Antietam Radio Assn. Hagerstown Junior College, Athletic and Recreation Community Center; from I-70 take Exit 32B to Edgewood Dr, turn right at Home Federal Bank, college entrance is located approx 1.4 mi on left. Hamfest/Computer Show, vendors, tailgating (\$5 per space plus admission), seminars, VE sessions (9 AM, preregistration requested, walk-ins accepted, Leo Patterson, KQ8E, 304-289-3576 or Gay Rembold, W3DFW, 301-724-0674), refreshments. *TI:* 146.94, 147.09. *Adm:* \$5, under 13 free. Tables: \$10. Don Jones, KB8WHW, Box 529, Harpers Ferry, WV 25425, 304-728-7769, fax 301-791-3010; kb8zqm@intrepid.net.

Massachusetts (Cambridge)—Apr 19. Nick Altenbernd, KA1MQX, 617-253-3776.

†**Massachusetts (Framingham)**—Apr 5; set up 7:30 AM; public 9 AM to 1 PM. *Spr:* Framingham ARA. Framingham High School, Mass Pike to Exit 13, Rte 30 W to Rte 126 N, 1.3 mi to A St, school on left. Flea market, tailgating (\$10), radio equipment, computers, commercial vendors, ARRL info, VE sessions, refreshments. *TI:* 147.15. *Adm:* \$3. Tables: advance \$10, door \$14. Bev Lees, N1LOO, c/o FARA, Box 3005, Framingham, MA 01705; 508-626-2012.

Michigan (Cadillac)—May 2. Dan Schmidt, KE8KU, 616-775-0998.

†**Michigan (Grosse Pointe Woods)**—Apr 26, 8 AM to 2 PM. *Spr:* South Eastern Michigan ARA. Grosse Pointe North High School, 707 Vernier Rd (M-102), between Mack and Lakeshore. Swap and Shop, trunk sales (weather permitting), packet demo, forums (ARRL, RACES/ARES, SKYWARN, AMSAT, satellite), VE sessions (Donald Olszewski, WA8IZV, 810-294-1567; SSTG41a@prodigy.com), refreshments. *TI:* 146.74, 146.52. *Adm:* advance \$4, door \$5. Tables: 8-ft \$10 (plus admission). Send SASE to Red Duggan, WA8RLI, Box 646, St Clair Shores, MI 48080, 810-777-2443; wa8rli@juno.com.

†**Michigan (St Joseph)**—Apr 19; set up 6 AM; public 8 AM to noon. *Spr:* Blossomland ARA. St Joe Kickers Sport Club; take I-94 to Exit 28, then S on US-31/M-139 to 1 mi S of Rocky Weed Rd. Vendors, trunk sales (weather permitting), VE sessions (9 AM to noon), free parking, refreshments. *TI:* 146.82, 146.72, 146.52. *Adm:* advance \$3 (before Apr 10), door \$4. Tables: advance \$4 (before Apr 10), door \$5. Barb or Duane Durlinger, 616-982-0404; comdac@comdac.com; <http://www.comdac.com/baral/>.

Minnesota (Duluth)—May 2. Bud Fisher, KB0SBL, 218-879-9284.

†**Minnesota (Fergus Falls)**—Apr 18, 8 AM to 3 PM. *Spr:* Lake Region ARC. Otter Tail County Fairgrounds, Ice Arena, off Rtes 82 and 59S-210E. Vendors, demonstrations, computers, ARRL forum, VE sessions. *TI:* 146.64. *Adm:* advance \$4, door \$5. Bill Morgan, AA0AX, Rte 6, Box 43, Fergus Falls, MN 56537; 218-736-4448.

†**Minnesota (Rochester)**—Apr 25, 8 AM to 1:30 PM. *Spr:* Rochester ARC. Olmsted County Fairgrounds, Graham Arena East, Broadway and 16th St SW, Hwy 63S and 14E. Flea market, dealers, exhibits. *TI:* 146.82. *Adm:* advance \$5, door \$6. John Scott, N0HZN, 4552 5th St NW, Rochester, MN 55901, 507-285-6522; n0hzn@aol.com; <http://members.aol.com/rarchams>.

†**Minnesota (Shakopee)**—Apr 19; set up 7 AM to noon; public noon to 5 PM. *Spr:* Southwest Metro AR Transmitting Society. Canterbury Park, US 169 and Canterbury Rd (Cty 83). Hamfest/Electronics Show, flea market, vendors, club info, VE sessions (1-3 PM, preregister, walk-ins accepted; Dave Zellman, WB0YDF, 612-466-5852), handicapped

accessible, free parking, refreshments. *TI:* 147.165. *Adm:* advance \$4, door \$5, under 16 free. Tables: \$10 (add \$20 electricity). Helen Haynes, WB0HOX, Box 144, Chaska, MN 55318; 612-361-6782.

Missouri (Cedar Hill)—Apr 19. Jim Autery, KA0WXXN, 314-296-3473.

†**Missouri (Joplin)**—Apr 18, 8 AM to 3 PM. *Spr:* Joplin ARC. John Q. Hammons Convention Center, I-44, Exit 8B, N to first light, turn right. VE sessions. *TI:* 147.21. *Adm:* \$5. Andy Gabbert, KA0TUD, Box 2983, Joplin, MO 64803-2983, 417-673-8371; agabbertka0tud@hotmail.com.

New Hampshire (Rochester)—May 8-9. Joe Demaso, K1RQG, 207-469-3492.

†**New Jersey (Harmony Twp)**—Apr 25. *Spr:* Cherryville Repeater Assn. Warren County Farmers Fairgrounds, I-78, Exit 3 to Rte 519 N, 4 mi to Fairgrounds. VE sessions, handicapped accessible, free parking, refreshments. *TI:* 146.73, 147.375. *Adm:* \$6. Marty Grozinski, W2CG, 6 Kirkbride Rd, Flemington, NJ 08822; 908-788-2644.

New Mexico (Albuquerque)—Apr 25. Chuck Opdyke, KC5GA, 505-858-0306.

†**New York (Poughkeepsie)**—Apr 26. *Spr:* Mt Beacon ARC. John Jay High School, Exit 15 off I-84, right onto Lime Kiln Rd, left onto Rte 52, pass Hudson Valley Research Park, first left after railroad tracks. VE sessions, free parking, refreshments. *TI:* 146.97. *Adm:* \$5. Tables: contact Ken Akasofu, KL7JQC, 316 Titusville Rd, Apt 4, Poughkeepsie, NY 12603-2944; 914-485-9617. General info: Gary, KB2SMQ, 904-272-5983.

New York (Syracuse)—Apr 25. Robert Hamby, W2WRH, 315-622-1068.

†**New York (Yonkers)**—May 3, 7 AM to 3 PM. *Spr:* Metro 70cm Network. Lincoln High School, Kneeland Ave; NYS Thruway (87 S) to Yonkers Ave Exit, go W to St Johns Ave, go 2 blocks, turn right on Theresa Ave, next block turn left on Kneeland. Giant electronic flea market, vendors, VE sessions, free parking, unlimited free coffee. *TI:* 449.425 (156.7 Hz), 223.76 (67 Hz), 146.91, 443.35 (156.7 Hz). *Adm:* \$6, under 12 free. Otto Supliski, WB2SLQ, 53 Hayward St, Yonkers, NY 10704; 914-969-1053.

North Carolina (Gastonia)—May 2. Lynn Hedspeth, KD4CDP, 704-735-2197.

†**Ohio (Athens)**—Apr 26; set up 7 AM; public 8 AM to 2 PM. *Spr:* Athens County ARA. Athens Recreation Center, 733 E State St; US Rtes 33 or 50, exit E State St, next to Athens Mall. Flea market (outdoor free, indoor space by reservation \$10, \$8 if at least one week in advance), computer equipment, exhibits, acres of parking, refreshments. *TI:* 145.15. *Adm:* \$5, nonham spouses free. Drew McDaniel, W8MHV, 61 Briarwood Dr, Athens, OH 45701, 614-592-2106 or 614-593-4855; mcdaniel@oak.cats.ohiou.edu; <http://www.seorf.ohiou.edu/~xx017/hamfest.html>.

†**Ohio (Canfield)**—Apr 26, 8 AM to 3 PM. *Spr:* Twenty Over Nine RC. Canfield Fairgrounds, Rte 224 to Rte 46. Hamfest/Computer Show, VE sessions. *TI:* 147.315, 443.225. *Adm:* \$5. Don Stoddard, N8LNE, 42 S Whitney Ave, Youngstown, OH 44509; 330-793-7072.

Oklahoma (Eufaula)—May 9. John Petersen, KMSES, 918-452-2279.

†**Oklahoma (Lawton)**—Apr 11; set up Friday 6-10 PM, Saturday 6:30 AM; public 8 AM. *Spr:* Lawton Ft Sill ARC. Comanche County Fairgrounds, West Central Oklahoma ARC. Community Civic Center, I-40, Exit 41. Hamfest/Computer Fair, forums, demonstrations, VE sessions. *TI:* 146.91. *Adm:* advance \$5 (before Apr 3), door \$7. Tables: advance \$10 (first, \$8 additional), door \$15 each. Bob Morford, KA5YED, 1415 NW 33rd St, Lawton, OK 73505, 580-355-6120; w5ks@rli.net.

†**Oregon (Hillsboro)**—May 9, 9 AM to 3 PM. *Spr:* Portland ARC. Washington County Fair Complex, from US 26 W take Cornelius Pass Exit to Cornelius Pass Rd, turn right on Cornell Rd to 28th Ave, across the street from Hillsboro Airport. Radio station display (how to assemble, install antenna, check RF safety, other various operating aids). *TI:* 146.84. *Adm:* \$3. Marilyn Lum, KJ7AY, 2024 SE Lincoln, Portland, OR 97214, 503-236-4463;

m.lum@worldnet.att.net or kj7ay@juno.com.

***Oregon (Pendleton)—Apr 11, 8 AM to 4 PM.** Spr: Pendleton ARC. Pendleton Convention Center, from Portland take I-84 to Exit 207, turn left, cross overpass, turn right onto Hwy 30, go 2 mi, Convention Center on left. ARRL meeting, NWS seminar, SKYWARN Nets, packet radio demonstration. *TI:* 146.88. *Adm:* \$5. Charlene Davis, KC7RQF, Box 44, Meacham, OR 97859-0044, 541-983-2281; c.w.davis@juno.com.

***Pennsylvania (Bloomsburg)—Apr 25, 8 AM.** Spr: Columbia-Montour ARC. Bloomsburg Fairgrounds, Rte 80 to Exit 34, Rte 42S to Fairgrounds. VE sessions, refreshments. *TI:* 147.225. *Adm:* \$4. Dave Schack, WC3A, 6020 Fort Jenkins Ln, Bloomsburg, PA 17815; 717-752-6851.

***Pennsylvania (Wrightstown/Bucks County)—May 3; set up 6 AM; public 7 AM to 1 PM.** Spr: Warminster ARC. Middletown Grange Fairgrounds, Penn's Park Rd, vicinity of Rtes 413 and 232, 25 mi N of Philadelphia. Vendors, tailgating (unlimited spaces), 80 indoor spaces with electricity, equipment check-out table, VE sessions, free parking, refreshments. *TI:* 147.09, 146.52. *Adm:* \$6, nonham spouses and children free. Tony Simek, N3YNH, 340 Centennial Rd, Warminster, PA 18974; 215-674-5218.

Rhode Island (Smithfield)—May 2. Frank Grzych, KE1FJ, 401-231-3993.

***Rhode Island (West Greenwich)—Apr 25; set up 7 AM; public 9 AM to 4 PM.** Sprs: Washington County and Fidelity ARCs. Fire Station, off Rte 3; from I-95 N take Exit 5A, go left onto Rte 3 for 2 mi. Flea market (\$6 per space), vendors, VE sessions (noon). *TI:* 147.105, 145.13, 146.58. *Adm:* \$1. Everett Lovenbury, N1VEZ, 232 Carolina Nooseneck Rd, Wyoming, RI 02898-1172, 401-539-1107; N1VEZ@juno.com.

South Carolina (Elko)—May 2. Bill Wetzel, W4OXA, 803-245-5522.

***South Carolina (Greenville)—May 9.** Spr: Blue Ridge ARS. Anderson County Fairgrounds, E of Anderson on Hwy 29 Business. *Adm:* advance \$4, door \$5. Gene Owensby, WB4ZBZ, 718 Fountain Inn Rd, Woodruff, SC 29388; 864-476-2609.

***Tennessee (Clinton)—Apr 11, 8 AM to 5 PM.**

Spr: Oak Ridge ARC. National Guard Armory. *TI:* 146.88. *Adm:* \$5. Tables: \$8 (no charge for electrical hookups). James Whittlesey, KC4RHW, 612 Red Bud Ln, Oliver Springs, TN 37840, 423-435-1068; kc4rhw@bellsouth.net.

Tennessee (Dayton)—Apr 18, 9 AM to 3 PM. Spr: Rhea County ARS. Dayton Skills Center, turn W at the junction of Hwy 30 and 27, go 1 block and turn right, Center is straight ahead. Hamfest/Computer Show, tailgating, free parking. *TI:* 147.39. *Adm:* \$5. Tables: \$10 (electricity free, supply limited). Tom Mize, KO4SY, 423-570-0840; <http://www.volstate.net/~ko4sy>.

***Texas (Abilene)—May 2-3; Saturday 8 AM to 5 PM, Sunday 9 AM to 2 PM.** Spr: Key City ARC. Abilene Civic Center. VE sessions, handicapped accessible, free parking. *TI:* 146.76. *Adm:* advance \$7 (must be received by Apr 28), door \$8. Tables: \$6. Peg Richard, KA4UPA, 1442 Lakeside Dr, Abilene, TX 79602; 915-672-8889.

Texas (Belton)—Apr 18. Mike LeFan, WA5EQQ, 254-773-3590.

Texas (Chicota)—Apr 25-26. Don Honsinger, KB5MUS, 903-732-3290.

***Washington (Spokane)—Apr 4; set up 7-9 AM; public 9 AM to 5 PM.** Spr: Lilac City ARC. St Ann Parish Hall, E 2120 First Ave. *TI:* 147.32, 146.52. *Adm:* \$4. Warren Kelsey, KJ7BB, 1405 S Crestline, Spokane, WA 99203; 509-534-8443.

***Washington (Stanwood)—May 9, 9 AM to 3 PM.** Spr: Stanwood-Camano ARC. Stanwood Middle School, from I-5 N or S take Exit 212 westbound, turn right on 88th Ave NW, turn left on 271st St NW, go W 2 blocks, school on right. Electronics, VE sessions, free parking, refreshments. *TI:* 145.19. *Adm:* \$4, under 12 free. Vic Henry, N7KRE, Box 941, Stanwood, WA 98292; 360-387-7705.

***West Virginia (Ripley)—May 3.** Spr: Jackson County ARC. Ripley Middle School. Flea market, VE sessions (bring original and copy of license), free parking, refreshments. *TI:* 146.67. *Adm:* \$4. Gary Casto, AG8RY, Rte 1, Box 59, Statts Mill, WV 25279, 304-372-2849; <http://jackwv.simplenet.com/jcsrc/index.html>.

***Wisconsin (Cedarburg)—May 2; set up 6:30 AM; public 8 AM to 1 PM.** Spr: Ozaukee RC. Circle-B

Recreation Center, intersection of Hwy 60 and County I, 20 mi N of Milwaukee, W of Grafton. Swapfest, VE sessions (9 AM), refreshments. *TI:* 146.97, 146.52. *Adm:* \$4. Tables: \$5 (4-ft, limited power available on request). Gabriel Chido, N9QQA, W58 N985 Essex Dr, Cedarburg, WI 53012-1439; 414-377-2784 or 414-284-3271.

***Wisconsin (Manitowoc)—May 9; set up Friday eve until 10 PM, Saturday 6 AM; public 8 AM to noon.** Spr: Mancorad RC. Manitowoc County Expo Center, intersection of Hwy 42-151 and I-43 on County Hwy R, follow signs. Hamfest/Computer Swapfest, flea market, electronics, dealers, vendors, VE sessions (all classes, Silver Lake College, Hwy 151, test registration closes at 9 AM), camping (920-683-4378), DXCC field checking, refreshments. *TI:* 146.61, 147.03. *Adm:* advance \$3, door \$4. Tables: 8-ft \$6, (electric outlet \$5). Send SASE to Mancorad RC, Box 204, Manitowoc, WI 54221-0204; or call Glenn DeBaker, AA9MT, 920-684-7096; gdebaker@lakefield.net.

***Wisconsin (Superior)—May 2, 9 AM to 2 PM.** Spr: Arrowhead RAC. Multi Purpose Building, I-35 to US 2/Bong Bridge, left on Belknap, right on Tower, approximately 2 mi to Fairgrounds, turn left. VE sessions. *TI:* 146.94. *Adm:* \$5. Jeff Daniels, NØVQF, 309 Third St, Box 467, Moose Lake, MN 55767-0467; 218-485-8131.

Attention All Hamfest Committees!

Get official ARRL sanction for your event and receive special benefits such as free prizes, handouts, and other support. If you are an affiliated club, you are also entitled to receive a 10% commission on sales of League publications!

It's easy to become sanctioned. Contact the Convention and Hamfest Branch at ARRL Headquarters, 225 Main St, Newington, CT 06111. Or send e-mail to giannone@arrl.org.

QST

New Products

SYNTHESIZED FM XMTR/RCVR MODULES FROM HAMTRONICS

♦ The newest additions to Hamtronics' large assortment of Amateur Radio hardware modules are the T301 exciter and the R301 receiver. Both units provide excellent performance in narrowband FM and FSK applications from 144 to 148 MHz. Features include DIP-switch frequency selection, low-noise synthesizer circuits for repeater use and commercial-grade crystal oscillators.

The T301 uses high-performance direct modulation for voice, subaudible tones and FSK performance up to 9600 bauds. Power output is 2 to 3 W, continuous duty. The R301 has sensitivity and selectivity on par with other Hamtronics receiver modules. Both modules are available factory assembled or as kits.

Prices: T301—\$189 wired, \$109 kit; R301—\$209 wired, \$139 kit. A temperature-

compensated crystal oscillator (TCXO) is a standard feature on wired units, a \$40 accessory for kit modules. For more information, contact Hamtronics, 65-Q Moul Rd, Hilton, NY 14468; tel 716-392-9430, fax 716-392-9420, e-mail jv@hamtronics.com, <http://www.hamtronics.com>.

A DUAL-BAND YAGI FROM COMET

♦ Using an innovative boom/element arrangement, Comet's new CYA-240 dual-band Yagi covers the 144- and 440-MHz ham bands with an SWR of 1.5:1 or less. The '240's design places the five UHF elements on the front half of the boom, with the three VHF elements laid out on the back half. The split arrangement keeps the antenna's respective radiation patterns as clean as possible.

Made of high-grade aluminum and stainless steel, the '240 uses quick-release wing nuts to lock elements in place, allowing for easy setup and takedown. The five-foot-long Yagi weighs less than five pounds and can handle up to 300 W on SSB, 150 W FM.

Price: \$109.95. For more information, see your local Amateur Radio products

dealer or contact NCG/Comet, 1275 N Grove St, Anaheim, CA 92806; tel 714-630-4541, fax 714-630-7024, <http://www.cometantenna.com>.

COMPACT MF/HF ANTENNA TUNER FROM PALSTAR

♦ The AT300 from Palstar is a compact antenna tuner that covers 1.8 through 30 MHz and can handle up to 200 W of "key-down" RF. At the tuner's core are a pair of 1.5-kV air variable capacitors and a tapped toroidal inductor (48 inductance values) with silver-plated switch contacts. Power output and SWR are displayed on an illuminated, frequency-compensated meter.

Measuring about 3x7x7.5 inches (HWD), the AT300 can be used with dipoles, end-fed wires, verticals, delta loops, beams, and more. Other features include a built-in dummy load; a built-in 4:1 balun for feeding balanced feeders; and an 8-position antenna selector with pass-through.

Price: \$139.95. For more information, contact Palstar, 9676 N Looney Rd, Piqua, OH 45356; tel 937-773-6255, fax 937-773-8003, e-mail Palstar@erinet.com. QST

Contest Corral

Edited by **Bev Fernandez, N1NAV** • Assistant Contest Manager

This month is the beginning of the ARRL VHF/UHF Spring Sprints, the perfect time to get your station's gear on-line before E-skip season hits.

In the 1997 ARRL International DX Phone Contest results, K2IBW's listing score should have been 126,825, 20 meters only. This put him in 4th place in the US and Canada. In the 1997 September VHF QSO Party results, K8TQK's score was omitted. His score was 146,248, placing him 3rd in the OH section and 7th place overall. In the 1997 June QSO Party results, operator N7QJP was omitted from the KF7NP listing.

Qualifying Runs

April W1AW Qualifying Runs will be 10 PM EST, Sunday, April 12, and 4 PM EST, Monday, April 27. This month's West Coast Qualifying Run will be 9 PM PST Wednesday, April 1, and will run from 10 to 40 WPM.

April

4-5

European EME Contest, 144 and 1296 MHz portion; see Mar QST, p 101.

EA RTTY Contest, sponsored by Union de Radioaficionados Españoles, from 1600Z Apr 4 until 1600Z Apr 5. 80-10 meters, single op all band and single band, and multiop all band. Send RST and CQ Zone (EA stations send RST, province prefix). Everyone works everyone. Score 1 pt/QSO on 20-10 m within own continent; 2 pts/QSO on 20-10 outside own continent; 3 pts/QSO on 80 & 40 m within own continent; and 6 pts/QSO on 80 & 40 outside own continent. Contacts within your own country are valid for multipliers, but not for points. Final score is QSO points \times DXCC countries (incl EA, EA6, EA8, EA9) and EA provinces worked per band. Awards. Send logs by May 9 to EA RTTY Contest Manager, Antonio Alcolado, EA1MV, POB 240, 09400 Aranda de Duero, Burgos, Spain, or e-mail to alcolado@redestb.es.

Elettra Marconi Contest, sponsored by the Italian YLRC, from 1300Z Apr 4 until 1300Z Apr 5. Phone or mixed (phone/CW/RTTY). 80-10 meters (except 30/17/12 m). Send RS(T) and serial no. (IYLRC members will add "RC"). Work stations once per band; YL-YL, YL-OM and OM-OM QSOs permitted. Score 1 pt/QSO with OM nonmembers; 2 pts/QSO with OM members; 3 pts/QSO with YL nonmembers; 5 pts/QSO with YL members. Final score is QSO points \times DXCC countries worked per band. Awards. Send logs within 30 days to Pina Lazzarini, IK5GBL, PO Box No 45, 55049 Viareggio (LU), Italy.

SP DX Contest, sponsored by the Polski Związek Krotkofalowcow (PZK), 1500Z Apr 4 to 1500Z Apr 5. Phone and CW, 160-10 meters (except 30/17/12 m). Single operator, all band or single band, mixed mode, phone only or CW only; multioperator (multiband, mixed mode only). Non-Polish stations send a RST and 3-digit QSO number. Polish stations send RST plus two-letter province designator. Work stations once per band and mode. Count 3 pts/SP-station QSO. Multipliers are provinces (49 max). Final score is QSO points \times multipliers. Awards. Also see <http://www.pzk.org.pl/zawody/spdx.htm>. Mail entries by Apr 30 to Polski Związek Krotkofalowcow, SP-DX Contest Committee, Box 320, 00-950 Warsaw, Poland.

11-12

Japan International DX Contest, CW, high-band portion (20-10 m); see Jan QST, p 105. Note date correction: Contest runs 2300Z Apr 10 until 2300Z Apr 12.

MARAC SSB County Hunter's Contest, sponsored by the Mobile Amateur Radio Awards Club, 0000Z Apr 11 to 2400Z Apr 12. 3.880 7.240 14.270 21.340 28.340. Work stations once per band, mobiles and portables as they change counties. Mobiles sign /m. Stations on county lines count as 1 QSO but multiple multipliers. Send RS; US county and state; non-US stations send province or DXCC country. Count 1 pt/QSO with W/VE fixed stations, 5 pts/QSO with DX stations, and 15 pts/QSO with mobile stations. Final score is QSO points \times US counties. Awards. Send logs by May 8 to Bill Nash, W0OWY, 1312 N. 37th Ave, Phoenix, AZ 85029.

QRP ARCI Spring QSO Party, CW, sponsored by QRP ARC International, from 1200Z Apr 11 until 2400Z Apr 12. Single band, all band, high band (20-6 meters) or low band (160-40 meters). Operate 24 hours max. Work stations once per band. Send signal report, state/province/DXCC country and ARCI number (if member), or power out (if non-member). 1.810 3.560 3.710 7.040 7.110 14.060 21.060 21.110 28.060 28.110 50.060. Score 5 pts/QSO with ARCI member, 2 pts/QSO with nonmember on same continent and 4 pts/QSO for nonmember, different continent. Final score is QSO points \times states/provinces/DXCC countries \times power multiplier (0-250 mW, \times 15; 250 mW to 1 W, \times 10; 1-5 W output \times 7; $<$ 5 W \times 1). Team competition. Awards. Mail entry (SASE for results) to QRP ARCI Contest Manager, Cam Hartford, N6GA, 1959 Bridgeport Ave, Claremont, CA 91711.

13

ARRL VHF/UHF Spring Sprint, 144 MHz, 7 PM to 11 PM local time on Mon, Apr 13. (Other Spring Sprint dates are 222 MHz on Tue, Apr 21; 432 MHz on Wed, Apr 29; 902 MHz/1296 MHz/2304 MHz on Sat, May 9; and 50 MHz on Sat-Sun, 2300Z, May 16 to 0300Z May 17.) The 902 MHz, 1296 MHz, and 2304 MHz Sprints will run simultaneously on Sat, May 9, 6 AM to 1 PM local time; you may work any five consecutive hours during this time period. The 902, 1296 and 2304 MHz Sprints are separate, but run concurrently. The usual VHF/UHF rules apply. Exchange grid-square locations (see Apr 1994 QST, p 87). Signal reports are optional. Score 1 pt per valid QSO. Final score is QSO pts \times grid squares. Contests are separate; there's no accumulation of scores. The official entry forms, found in the 1998 ARRL Contest Yearbook, are recommended. Logs must indicate time, call sign and complete exchange for each valid QSO. Multipliers must be clearly marked in the log. Submit separate log and summary sheets for each Sprint entered and mail Sprint entries in separate envelopes. Entries may also be submitted via Internet (to contest@arrl.org), BBS (860-594-0306), or on disk, following the ARRL Suggested File Format. Entries for each contest must be postmarked by Jun 19.

Low Power Spring Sprint, sponsored by the Slovak ARA, 1400Z-2000Z Mon Apr 13. CW only, 160-10 m (except 30/17/12 m) on IARU recommended contest band segments. Single op only; single band, three bands, all bands. Exchange RST, Maidenhead grid square (eg FN31 — see Apr 1994 QST, p 87) and power category (A = $<$ 1 W; C = $<$ 5 W; Q = $<$ 25 W; X = $<$ 50 W; Y = $<$ 100 W). Count 3 pts/QSO with own continent, 9 pts/QSO with other continents and 18 pts/QSO with OM stations. Multipliers are grid squares plus and prefixes (WPX rules) worked per band. Final score is QSO pts \times multipliers. Send entries within 30 days to Radioclub OM3KFV, PO Box 29, 036 01 Martin 1, Slovakia.

17-19

DXYL-NAYL Contest, CW, sponsored by the YLRL, from 1400Z Apr 17 until 0200Z Apr 19 (phone contest is Apr 24-26). YLs only. Send RS(T),

QSO no., and section/province/DXCC country. W/VE YLs work DX YLs, and vice versa. KL7 and KH6 count as DX. Work stations once per band. Score 1 pt/QSO. Multipliers are sections/provinces/DXCC countries, and count once. Stations running $<$ 150 W output (phone: 300W PEP) multiply score by 1.5. Final score is points \times multipliers \times power multiplier. Also see <http://home.earthlink.net/~tenmtryl/ylrl/ylconst.htm>. Send logs within 30 days to Cleo Bracket, K0JFO, 810 Towne Square Dr, Fremont, NE 68025.

Holyland DX Contest, sponsored by the Israel ARC, from 1800Z Apr 18 until 1800Z Apr 19. Single-op all band and multi-single. Phone and CW. Send RS(T) and serial no. (Israeli stations send RST and area). Work Israeli stations only. Work stations once per band and mode; no crossband or crossmode contacts. Score 2 pts/QSO on 160-40 meters, and 1 pt/QSO on 20-10. Final score is QSO points \times Israeli areas worked per band. Awards. Also see <http://hamradio.iarc.org/contests/>. Send logs to Israel ARC, POB 17600, Tel Aviv 61176, Israel.

Michigan QSO Party, sponsored by the Hazel Park ARC and Eastern MI ARC, from 1800Z Apr 18 until 0300Z Apr 19 and 1100Z Apr 19 until 0200Z Apr 20. Phone and CW. Single op, multiop, QRP and mobile; only one transmitted signal at a time. Work stations once per band and mode. MI-to-MI QSOs allowed. Work portables and mobiles again as they change county. Exchange signal report, QSO no. and QTH (county for MI stations, state/province/DXCC country for others). CW—1.810 3.540 3.725 7.035 7.125 14.035 21.035 21.125 28.035 28.125; phone—1.855 3.905 7.280 14.280 21.380 28.580; VHF—50.125 145.025 146.55. No repeater QSOs. Count 1 pt per phone QSO and 2 pts per CW QSO. QSOs with club stations K8EPV and W8JXU count 5 pts. MI stations multiply by sum of states, provinces, counties and MI counties worked (max 85) for final score. Others multiply by number of MI counties worked (83 max). Awards. Mail logs by May 31 to MI QSO Party (EMARC), PO Box 611230, Port Huron, MI 48061-1230 or e-mail k8dd@contesting.com.

25-26

DXYL-NAYL Contest, CW, see Apr 17-19 listing.

Florida QSO Party, sponsored by the Florida Contest Group, 1800Z Apr 25 to 0359Z Apr 26 and 1400Z-2359Z Apr 26. Categories: single op, mobile (single op or multiop), Novice/Tech (mixed mode, phone only, CW only); multi-single and multi-multi (mixed mode only; max 1 signal per band). Three power classes for all categories: QRP ($<$ 5 W), low power ($<$ 150 W) and high power ($>$ 150 W). Exchange signal report and state/province (DX stations send DX); Florida stations send county. Work stations once per band and mode. Work Florida mobile stations again as they change county. Suggested frequencies: CW, 3.545 7.045 14.045 21.045 and 28.045 and 10 kHz up for Novices/Technicians; phone, 3.850 7.225 14.250 21.300 and 28.450. Count 1 pt per phone QSO, 2 pts per CW QSO. Multipliers—for Florida stations, 50 states; Canadian areas (MAR, NL, VE2-VE8, YT); DXCC countries (except W, VE, KH6, KL7). All others count Florida counties (67). Count multipliers once per mode. Final score: Multiply QSO points by total multipliers by the power multiplier ($<$ 5 W, \times 5; $<$ 150 W, \times 2; $>$ 150 W, \times 1). Logs must be postmarked by May 26, 1998. E-mail FLQSOParty@aol.com, or send your entry to Florida Contest Group c/o Jim White, K4OJ, 1508 W Patterson St, Tampa, FL 33604. Also see <http://home1.gte.net/wd4ahz/fcg/ssqp.htm>.

Helvetia Contest, sponsored by USKA (Switzerland), 1300Z Apr 25 to 1300Z Apr 26. 160-10 meters (except 30/17/12 m; CW only on 160 m). Mixed mode only, single op or multi-single. Work stations

once per band. Send RS(T) and serial no. HB stations will also add Canton prefix. Count 3 pts/QSO with HB stations. Multipliers are Cantons worked per band (max 26 per band). Awards. Send logs by May 31 to Nick Zinsstag, HB9DDZ, Salmendorfli 8, CH-5084 Rheinsulz, Switzerland.

Nebraska QSO Party, sponsored by the Nebraska QSO Party Group, from 1700Z Apr 25 until 1700Z Apr 26. Single op, multi-single, mobile, and Novice/Tech. Send RS(T) and state/province/DXCC country (NE stations send county). Work stations once per band and mode. CW—1.805 and 60 kHz up from band edge; phone—1.865 3.860 7.260 14.260 21.360 28.360 146.46; Novice—28.380 and 10 kHz up from band edge. Score 1 pt per phone, 2 points per CW QSO. NE mobiles may add 50 QSO pts for each county operated from; NE portables may add 100 QSO pts for each county operated from (excluding county of residence). Work mobiles/portables again as they change county. Final score is QSO points × NE counties (max 93); NE stations multiply by states (50), provinces (8) and DXCC countries (max 35) for a possible maximum of 93. Club Competition (3 entries min). Awards. Send logs by May 31 to Nebraska QSO Party, POB 375, Elkhorn, NE 68022-0375.

Ontario QSO Party, sponsored by the Ontario DX Association, 1800Z Apr 25 to 1800Z Apr 26. Phone and CW, 160-10 meters (except 30/17/12 m) and all VHF/UHF bands (no repeater QSOs and keep 146.52 MHz clear). Categories: Single operator low power (<150 W on HF and <50 W on VHF/UHF); single operator high power; single operator, single

band; mobile; HF QRP (<5 W); VHF/UHF FM QRP (<5 W); multioperator; CW, SSB or mixed mode. Exchange signal report state/province/DXCC country. Ontario station exchange signal report and county/district/regional municipality. Work Ontario stations only (Ontario stations work everyone). Work mobile and portable stations again as they change county/district/regional municipalities. Work stations once per band. Count 1 pt/QSO, 10 pts (each band) for working VE3ODX and VA3RAC. Multipliers are Ontario county/district/regional municipalities (For Ontario stations: county/district/regional municipalities, and state/province/DXCC countries). Final score is total QSO points × total multipliers worked (max 48). Awards. Also see <http://www.grove.net/~odxa/qsorules.html>. Send logs by May 31 to Ontario DX Association, Box 161, Stn A, Willowdale, ON M2N 5S8 Canada, or email to ve3sre@compuserve.com.

QRP to the Field, sponsored by the NorCal QRP Club, 1600Z to 2400Z Apr 25. CW HF QRP only (5 W max), no 30/17/12 m operation. Exchange RST and state/province/country (SPC). This year's theme is "Run to the Borders." Stations operating from an SPC border get an extra multiplier for each SPC intersecting at their exact location (see scoring section below). Example, K16DS operates from the CA-AZ border, getting a ×2 "border operator" multiplier. He must exchange a signal report with each state (eg. 579 CA, 579 AZ). Stations working K16DS would get SPC multiplier credit for each state, as well as QSO pts for each separate signal report received. Scoring: Count 5 pts/QSO. Multipliers: SPC total per band; for bor-

der operators, the number of SPCs intersecting at your position; and location (home ×2, field ×4; field = battery power and temporary antennas). Final score = QSO pts × SPC total × location × border operator multiplier. Also see <http://www.fix.net/~jparker/norcal.html>. Awards. Send logs by June 1 to Joe Gervais, AB7TT, Box 1822, Goodyear, AZ 85338, or email vole@primenet.com

May Events

2-3	Connecticut QSO Party
2-3	Danish SSTV Contest
2-3	MARAC County Hunters CW Contest
9	ARRL Spring Sprints—902, 1296, 2304 MHz
9-10	Oregon QSO Party
9-10	Nevada QSO Party
9-10	CQ-M International DX Contest
16	ARRL Spring Sprints—50 MHz
23-24	Texas QSO Party

Contest Announcements: Items for this column can be sent on a MS-DOS disk in ASCII format, via modem (860-594-0306), via fax (860-594-0259), via Internet (to contest@arrl.org), or in letter form. Submissions must be received no later than the 1st of the second month preceding the publication date; ie, a contest in June would have to be received by April 1.

QST

New Products

6-METER YAGI FROM MFJ

◇ Weighing in at just two pounds, MFJ's Model 1762 6-meter Yagi is a 3-element design that offers gain and directivity over a dipole or vertical antenna. With its six-foot boom length, the '1762 can be installed with conventional TV mast and antenna-mounting hardware.

The Yagi is fed with 50-Ω coax through a current balun and the company's no-tune "hairpin" impedance matching system. The beam can be mounted vertically or horizontally and can handle up to 300 W PEP.

Price: \$69.95. The MFJ-1762 is covered by the company's "no matter what" one-year unconditional warranty. If the 6-meter beam isn't available at your favorite ham radio dealer, contact MFJ, PO Box 494, Mississippi State, MS 39762; tel 800-647-1800; fax 601-323-6551; <http://mfjenterprises.com>.

DUAL-BAND ANTENNAS FOR TRUCKS, 4x4s

◇ Tired of breaking off your dual-band antenna every time you veer off the beaten path (or pull into the garage)? Comet's SBB-1/SBB-1NMO dual-band whip antennas may be just what you've been looking for.

Designed for damage-free service on high-profile vehicles, the flexible, rubber-coated whips cover 2 m and 70 cm and are resilient when bumped, but stay "vertical" at highway speeds to maintain good radiation patterns.

The antennas are 16 inches tall, have a black anodized coating and come in two popular mountings. The SBB-1 features a PL-259 plug, while the SBB-1NMO sports an NMO-style connector.

Price: \$39. If you can't find the new whips at your local Amateur Radio dealer, contact

Comet at 1275 N Grove St, Anaheim, CA 92806; tel 800-962-2611; fax 714-630-7024; <http://www.cometantenna.com>.

CENTER INSULATORS FROM SCHRAM-TENNA

◇ New from Schram-Tenna are center insulators (and insulator kits) for dipoles and loops. Made from high-density polymers with stainless-steel hardware, the rugged insulators are virtually immune to weather effects. Electrical connections are made via SO-239 coaxial connectors and coiled strain relief wires. Available soon is a model for antennas fed with open-wire line. Center insulators are available in 3/4- and 1/2-inch sizes in a variety of colors.

Prices: Dipole center insulator, \$8; loop antenna kit, \$25. For more information, contact Schram-Tenna, 515 E Washington Center Rd, Ft Wayne, IN 46825; tel 219-483-1778.

DXING CLOCK FROM WORLD VIEW TIME

◇ Showing UTC (local and worldwide) with an attractive DX flair, World View Time's DXing Clock displays 24 global times zones superim-

posed over a south polar view of the Earth. You can personalize your clock with a call-sign engraved plaque at no extra charge.

Prices: black plastic (\$39.95); solid walnut (\$59.95). Add \$4 for shipping and handling. For more information, contact World View Time, PO Box 266, Brockville, ON K6V 5V5; tel 613-345-1537; fax 613-345-7264; e-mail worldviewtimeinc@recorder.ca; <http://www.recorder.ca/worldviewtimeinc>.

QUICK-DISCONNECT DUAL-BAND MOBILE ANTENNA FROM COMET

◇ Comet's QE-5 dual-band mobile whip antenna can be instantly removed from your vehicle by pulling up on a spring-loaded collar near the top of the loading coil. No more theft, vandalism or car wash damage! The 38-inch whip covers 2 meters and 70 centimeters and has a standard PL-259 connector.

Price: \$54. If you can't find the quick-disconnect dual-bander at your local Amateur Radio dealer, contact Comet, 1275 N Grove St, Anaheim, CA 92806; tel 800-962-2611, fax 714-630-7024, <http://www.cometantenna.com>.



Strays

SUBMARINE MEMORIAL RADIO REACTIVATION

◇ On April 25 and 26 the radio rooms on as many as 23 memorial submarines will come alive with ham activity. This year's lineup will include the *Torsk* in Baltimore, the *Cod* in Cleveland and the *Growler* in New York City. The frequencies will be 3.843, 7.243, 14.243, 21.343 and 28.343 MHz. QSL information will be available on the air. For more information e-mail Jim Flanders, W00OG, at jaf@sprintmail.com.

QST

Silent Keys

By Kathy Capodicasa, N1GZO

It is with deep regret that we record the passing of these amateurs:

KA1CBN, William J. McKearin, Dover, NH
K1ETN, Austin A. Lebert, Chicopee, MA
W1GFI, Sydney V. Jones, Canaan, CT
KA1KDS, Donald E. Soule, Sangerville, ME
K1KER, Reginald D. Whitcomb, Riverside, RI
W1NLE, Robert A. Adolphson, Springfield, MA
W1OJA, Robert C. Harvey, South Hadley, MA
*K1SCN, Sam Spino, Waterbury, CT
N1VGS, Arthur L. Cartier Jr, West Haven, CT
K2ANM, Dean N. Wallace, Herkimer, NY
W2DY, Thomas J. Finnerty, Collingswood, NJ
KC2EC, Everett G. Leach, Pensacola, FL
W2IIF, Robert S. Eccles, Indianapolis, IN
W2JKF, J. R. Edinger, Jensen Beach, FL
WA2MKI, Larry L. Ferrari, Philadelphia, PA
N2RJJ, Howard G. Bennett, Wappingers Falls, NY
W3BDQ, Malcolm K. Barlow, Bethlehem, PA
KY3D, Richard W. Blasco, Erie, PA
*KC3GM, Bruce E. Strem, New Port Richey, FL
W3MMY, Merle W. Henry, Indiana, PA
KD3NI, James L. Cothran, Paoli, PA
W3OPY, Albert Bulmer, Linwood, PA
*WA4AIV, Thomas J. Norman, Laurinburg, NC
W4BIM, Dale D. Meyers, Pensacola, FL
WA4BMV, Charles Q. Wolf, Nashville, TN
W4DMN, Allie E. Bass, Crossville, TN
K4DXW, Francis G. O'Connor, Mobile, AL
N4EMP, John W. Whitehouse, Columbia, SC
K4GJJ, Thomas F. Wyatt Jr, Mobile, AL
AD4HP, Jerry D. Berry, Russellville, AL
WA4IRT, John S. Locke III, Mobile, AL
WA4IYR, John W. Adams Jr, Mobile, AL
K4JKV, Neil G. Wilcoxson, Florence, AL
W4JNY, William C. Ballew, Virginia Beach, VA
KS4LX, William F. Head Jr, Punta Gorda, FL
WD4NBA, John A. Hancock, Mobile, AL
WB4PQQ, Clair W. Chellberg, Shalimar, FL
KD4QQJ, Ronnie P. Cavins, Columbus, GA
KC4RKJ, Robert A. Matthew, Kingman, AZ
K4RQQ, Murray C. Flanders, Spanish Fort, AL
*K4TJB, Henry Hedden, Clinton, TN
WA4TPB, Harry D. Bradshaw, Lexington, KY
KE4TPI, Jerry E. Sargent, Northport, AL
WB4TQH, John H. Fornash, Lake Worth, FL
W4USD, William A. Todd, Crescent City, FL
WA4WUP, Stan A. Hutcheson, Sebring, FL

KN4XY, Ernest R. Champagne, Ellenton, FL
K4YWE, Willis F. Slagle, Alexander City, AL
N5AZH, John C. Doolittle, Mountain Home, AR
KC5CBE, Michael T. Noe Sr, Abilene, TX
W5CP, Ben F. Holloman, Dallas, TX
*NA5DX, William B. Rohrbach, Deming, NM
W5ERO, James W. Brooks, Lubbock, TX
W5FGT, Karen O. Soule, Kilgore, TX
W5FHO, Aubrey L. Fox, Austin, TX
W5GT, Paul Dillon, Irving, TX
WD5GZO, Mike J. Edwards, Baton Rouge, LA
K5HFW, Clara Mc Guire, Cordell, OK
WD5HKQ, William D. Jones, Dexter, NM
W5IAN, Jack C. Gunn, Pasadena, TX
N5JKX, Victor A. Quin, Sherman, TX
WB5LWJ, W. H. Jacobs Sr, Melbourne, AR
W5QIX, Robert J. Allen, Cotton Valley, LA
K5RAG, Glen O. Bradley, Jonesboro, AR
NN5R, George E. Corkren, Raymond, MS
W5SNM, Ernie Miller, Ardmore, OK
W5SWZ, Edwin G. Phy, Snyder, TX
KB5T, Oliver L. Kingsley, Las Cruces, NM
AA5UT, Gordon Foster, Morris, OK
K5WXR, Robert M. Mitchell, Rogers, AR
W6CBC, Dellver S. Seastrom, Sacramento, CA
KG6DG, Joseph W. Newman, San Luis Obispo, CA
*K6EV, Erceel E. St John, Los Angeles, CA
W6IEQ, Vincent E. Parker, Upland, CA
KD6RQC, John R. Hartz, Glendora, CA
KG6SL, Bert D. Thompson, Saipan, MP
N6VHL, Harold E. Smith, Fresno, CA
WB6WWY, Robert E. Douglass, Santa Maria, CA
NC6X, Garret Butterfield, Sacramento, CA
*KL7AF, Tony P. Smaker Jr, Kodiak, AK
W7DUP, Alvin H. Schuurle, Saint Anthony, ID
W7FTX, Clarice L. Goodman, Hamilton, MT
KJ7JD, Joseph W. Johnson, St George, UT
W7KXC, E. R. Dietsch, Redmond, WA
W7LBH, Frederic H. Dickson, Albany, OR
KB7MU, Marvin M. Mitchell, Carson City, NV
W7PB1, Hilbert A. Soderstrom, Redmond, WA
N7PTR, Thomas W. Baumann, Salem, OR
NS7R, Paul V. MacDonald, Lyman, WY
N7SRX, Bruce Hoveland, Bigfork, MT
N7SSU, L. G. Carmody, Yakima, WA
KA7SZU, Art Walsh, Hamden, OH
*K17W, Albert A. Jaussaud, Cody, WY
KB7WQV, James R. Peters, Amado, AZ
KA7YVJ, Doris J. Johnson, Sun City, AZ
K7ZQJ, Orval J. Baker, Odessa, MO
KA8AGS, Clyde B. Plessinger, Canton, OH
WA8AHX, Ernest R. Baullinger, Ontonagon, MI
K8ANA, Marvin D. Denison, Strasburg, OH
WD8BLM, Arvil C. Fisher, Roseville, MI
WA8BQT, Clare Seplinski, Wayland, MI
W8GMI, Leland G. Smith, Medina, OH
K8JIM, Ashton T. Ogle, Schaumburg, IL
W8MBM, Frank C. Weyerman, Hastings, MI

W8MOF, Howard K. Harder, Oceanside, CA
KA8MPD, Donald E. Hill, Ironton, OH
K8NQP, Joseph B. Vaughan, Norwood, OH
W8PAE, Mc Coadum D. Winn, Mount Clemens, MI
W8UVI, Darrel J. Hunter, Hamilton, OH
WA8Y, William J. Karl, Columbus, OH
W9BWN, Harold L. Radies, Franklin Park, IL
K9CGQ, D. Lunday, Fairland, IN
W9DOR, Kenneth R. Leiser, Kihei, HI
KB9DYB, F. M. Fierce, Sister Bay, WI
*N9DYN, James N. Tobey, Rochester, IN
W9JRK, Averell M. Brown, Indianapolis, IN
*W9NG, Ervin W. Young, Medora, KS
AA9QX, John G. Clark, Wayne City, IL
†W9TQV, Hubert G. Willis, Manitowoc, WI
KA9TTH, Merrel R. Maxey, Anderson, IN
W9VVJ, R. C. Ferguson, South Bend, IN
KE9XX, Stanley J. Thomas, Indianapolis, IN
N0CMT, Marlene R. Christensen, Vermillion, SD
*N0EMG, J. A. Oden, Wichita, KS
KF0IZ, R. L. Harrell, Hutchinson, KS
WA0KDM, W. E. Johnson, Watertown, SD
K0MNA, William M. Downs, Wichita, KS
WB0YVG, Cameron H. Copple, Council Bluffs, IA
*W0YZS, Michael R. Vestal, Phnom Penh, Cambodia (Kampuchea)
*VA2DY, M. Daviau, Mansonville, PQ, Canada
ZL2JDR, John Robertson, New Plymouth, New Zealand
9Y4KIB, Knolly I. Burnham, Chaguanas, Trinidad & Tobago
ON5TB, Michel Trussart, Jemeppe, Belgium
DL7CE, Johannes Eckert, Berlin, Germany
*Life Member, ARRL
**Charter Life Member, ARRL
†Call sign has been re-issued through the vanity call sign program.
Note: Silent Key reports must confirm the death by one of the following means: a letter or note from a family member, a copy of a newspaper obituary notice, a copy of the death certificate, or a letter from the family lawyer or the executor. Please be sure to include the amateur's name, address and call sign. Allow several months for the listing to appear in this column.

Many hams remember a Silent Key with a memorial contribution to the ARRL Foundation. If you wish to make a contribution in a friend or relative's memory, you can designate it for an existing youth scholarship, the Jesse A. Bieberman Meritorious Membership Fund, the Victor C. Clark Youth Incentive Program Fund, or the General Fund. Contributions to the Foundation are tax-deductible to the extent permitted under current tax law. Our address is: The ARRL Foundation Inc, 225 Main St, Newington, CT 06111.

QST-

75, 50 and 25 Years Ago

April 1923

♦ "Time for Action" is proclaimed on the cover by Clyde Darr, 8ZZ, showing a ham at the key and a clock behind him, with the hands showing 10 o'clock. The editorial tells the story behind the cover: The 67th Congress ended with the radio bill still not passed. Until a radio bill emerges, the editorial advises, in bold-face type, "to refrain from transmission of any kind...between the hours of 7:30 o'clock and 10 o'clock" PM, in order to avoid interference to broadcast listeners. Another editorial, "City Ordinances," reports that more and more cities and towns are passing local ordinances "prohibiting amateur transmission within the city limits." The ARRL offers that it will help local hams deal with these "unconstitutional" local laws, but says that "the job primarily is one for handling by you men on the ground."

L. A. Hazeltine tells about "Tuned Radio-Frequency Amplification with Neutralization of Capacity Coupling," in a radio that he calls "The Hazeltine Neurodyne." S. T. Woodhull, tells how to get "Receiver Plate Supply from A.C.," and M. G. Goldberg, 9APW, reports on "A Study of Filter Systems for Transmitter Tube Plate Supply." O. A.

Kimball, 9RY, describes "Building a Super-Heterodyne and Making it Work," and L. W. Hatry, 5XV, relates "How to Make a 5-watt Tube Reach Out." "6ZH Graduates by Radio" tells how Lester Pickett was "present" via radio at his class graduation ceremony, even delivering some remarks to the class over the air. Lester was confined to his bed following an antenna-raising accident in which he sustained a broken back. And so, "for the first time in history, a student has been graduated from his school by radio."

April 1948

♦ The cover shows the architect's sketch for the proposed United Nations Amateur Radio Station. The editorial discusses the potential for harm in the typical ham shack, and closes with the admonition, "Switch to Safety!"

J. L. A. McLaughlin tells about his Simple Simon IF adapter in the article "Selectable Single-Sideband Reception Simplified." Oswald Villard, W6QYT, discusses "Selectivity in S.S.S.C. Reception," using yet another receiver adapter. Vernon Chambers, W1JEQ, tells about "Better Reception for 2-Meter Mobile," using a simple tunable converter (two 6J6 tubes) with 1.6 Mc. output to feed to the auto receiver. Stephen van Esen, W2OXD, describes his "Compact 20-Watt Rig for 50 Mc." "Disaster Strikes—AEC Strikes Back" tells of the work of the Amateur Emergency Corps following a tornado in Louisiana and a blizzard in Illinois and Iowa.

April 1973

♦ The cover shows Bob Artigo, W6GFS, testing his new solid-state 2-meter amplifier, which is described in the article, "Fundamentals of Solid-State Power-Amplifier Design," co-authored by J. J. Johnson, ex-K4WYZ and Bob. The editorial announces that HQ is mailing this month's issue of QST with labels produced by the new electronic data-processing system. Soon to come—a new form to announce upcoming membership expiration.

Albert Helfrick, K2BLA, tells about building "A Solid-State SSB Generator with Digital Read-out." "A Band-Edge Marker Generator," by Ki Negro, WN6QJP, is designed to help Novices avoid straying outside their subbands, now that they are allowed to use VFO control. "Field Day Filters," by Robert Myers, W1FBY, and Clarke Greene, WA1JLD, describes helical resonators to minimize mutual interference among multiple operating positions at Field Day. Part 1 of "Another Look at Reflections," by Walter Maxwell, W2DU/ W8KHK, is the first in a series of QST articles that will discuss the various facets of RF transmission line operation. Carl Heinen, W0MCN, tells about "The Dual Six—A QRP Transmitter for 40 and 80 Meters." "The Managua Earthquake—A Christmas Tragedy," by David Sumner, K1ZND, tells how hams helped so much and so effectively following that major earthquake. —Al Brogdon, W1AB (with tnx to Jay O'Brien, W6GO, and his library of QSTs)

QST-

The 1997 ARRL 160-Meter Contest Results

Interest in the Top Band Contest continues to hold strong. There are a number of factors contributing to the success of the contest. One is the mere nature of the band. Operators seem to be more laid back and polite on 160. (This by no means diminishes the competition or the fierce battles for the top spots.) Contacts are plentiful and multipliers are easier to accumulate than one may think. There is a feeling of accomplishment when working stations that are 500 miles or more away, not to mention the thrill of completing a DX QSO with another continent. Working DX is always fun, and on 160 meters, it's twice as enjoyable.

Another contributing factor to the success of this year's contest was the better-than-normal band conditions with low atmospheric noise during most of the contest. Good band conditions are essential for high scores. We received good reports from all corners of the world. Aki, JE1SPY, relates, "Band conditions were very good. Japanese stations can work Europe and North America at the same time." (Although only the W/VE contacts count for DX stations during the contest.) Murphy cooperated quite well in the weather department. We didn't have all the snow, ice and wind we suffered during last year's contest. We did have a few reports of a storm or two, but nothing like last year.

Even though entries in this year's contest were down a little from last year's record number of entries (777), they were slightly higher than the number of entries in 1995. For 1997, we received 735 entries. There is no doubt that there were some of the 160-meter regulars out there giving the contesters a helping hand. The top scoring stations were completing between 1300 and 1400 QSOs!

Veteran 160 contesteer Jeff, K1ZM, operating from Cape Cod, Massachusetts, and taking advantage of the 5 pointers into Europe, outscored all others in the single-operator high-power category. Jon, N5JA, gave it his best ending up 57,000 points shy for a second place finish. Jon outgunned Jeff with QSO totals (N5JA completed 1361 QSOs, K1ZM completed 1322). It was the multipliers that did N5JA in. Jeff had 119 multipliers, Jon had 107. Is this another story of the "East Coast advantage"? You be the judge.

Again this year, the top spots in the low power category were very close with less than 3000 separating them. Eastern New Yorker, Bob, W2XL, topped the list of the low power single operators. Gordon, WA1LNP, finished in second place. The QRP category is becoming quite popular. Out of the 72 entries that tried QRP, Charlie, N0TT, finished in first

place with 95,000 points. Richard, WK3I, was second with 81,000. In the multioperator category, the crew at W4WA edged out WB9Z by 14,000 for the win. Check the boxes for other winners.

Club Competition for the gavel is still in its infancy. From the beginning, there hasn't been much change in the standings. It almost looks like a snapshot of last year's results. The Frankford Radio Club took the Unlimited category with 52 entries. The Potomac Valley Radio Club mustered a few more club

members this year for their Medium Club gavel with the highest club score in any category. In the Local Club category, the Hudson Valley Contesters and DXers easily win again this year.

For those who haven't tried the ARRL 160-Meter Contest, you are missing out on the fun. Mark your calendar for this year's competition, December 4-6, 1998.



Jeff, K1ZM, was delighted to see so much participation from outside W/VE. Jeff finished in first place, single operator, high power.

Top Ten

Single Operator, QRP		Single Operator, High Power	
N0TT	95,025	K1ZM	383,180
WK3I	81,690	N5JA	325,922
N9JF	70,856	VE3EJ	291,593
W8VK	67,518	N1BB	283,291
K3CR	57,600	KQ2M	264,276
(K3AFT,op)		N4AR	249,400
K0RI	56,070	K8CC	245,427
VE3DO	53,106	(W8MJ,op)	
K9OM	44,073	K3RR	234,816
K8LUQ	42,036	K9DX	233,151
N9NE	41,202	K5NA	212,236
Single Operator, Low Power		Multioperator	
W2XL	170,016	W4WA	325,066
WA1LNP	167,854	WB9Z	311,472
K1PX	140,800	WW2Y	310,640
W3EEE	139,040	K8MK	300,195
K7CA	138,013	K8KS	267,549
N4CM	133,760	K8ND	238,452
K1HTV	129,750	W9RE	237,632
W0UO	124,821	W4MYA	217,798
W04O	123,424	N0NI	216,152
WJ0M	115,192	K3WW	212,042

Murphy, Leave me Alone!

By Rich Carstensen, W8VK

Murphy wants to be my "pal" during almost every ARRL 160-Meter Contest. In 1995, a coax feed-through went bad and, as a consequence, my TS-520S transceiver was damaged. I switched to my TS-520SE, but after 30 minutes it succumbed to Murphy, too. My dreams of first-place in the QRP class went down the drain.

In 1996, Murphy struck again. This time it was the weather. Ohio was hit with a bad ice storm. My antenna tower and the inverted Vs were covered with ice. Heavy winds came, and down went the wire antennas.

In June of 1997, I rebuilt the tower and strung some new wire antennas in the hope of catching the QRP first-place spot. Before I knew it, December 5—contest day—had arrived. As I sat waiting for the last 30 minutes to tick by, some thoughts came to mind. It had been two years since I'd contested as a single operator for more than 12 hours. My code speed was the worst it had ever been in two years. I hadn't used two computer keyboards together for some time. (That was part of my shack PC upgrade.) With so many good contest operators out there, I knew that clinching the top QRP spot was probably unreasonable. I set my sights somewhat lower—my goals for this year would be to nail down the championship for the Great Lakes, the Central Region, and to catch that 50th state for WAS on the Top Band.

I pounded through the first night with fierce determination. By 8 AM the sun was rising and activity was starting to die off—for now. I quickly summed up the operating period. I had maintained a pretty good QSO rate, and was down a few sections from my score in 1994.

I arrived back at the contest site around 2:30 that afternoon. Murphy had been visiting while I was away! A combination of wind and ice had tangled the antenna wires. What a mess! It took me two hours to restore everything to normal.

The second night of operating went very well. I finished my Worked All States on 160 when I bagged AH6M in Hawaii. My final score calculation beat my own records from 1994. I can't wait to see this year's results in the April QST.

Northeast Region			Southeast Region			Central Region			Midwest Region			West Coast Region		
New England, Hudson and Atlantic Divisions; Maritime and Quebec Sections			Delta, Roanoke and Southeastern Divisions			Central and Great Lakes Divisions; Ontario Section			Dakota, Midwest, Rocky Mountain and West Gulf Divisions; Manitoba and Saskatchewan Sections			Pacific, Northwestern and Southwestern Divisions; Alberta, British Columbia and NWT/Yukon Sections		
WK3I	81,690	A	KV8S	34,398	A	N9JF	70,856	A	N0TT	95,025	A	WW7CC (K7FR,op)	35,264	A
K3CR (KB3AFT,op)	57,600	A	N5OE	34,221	A	WBVK	67,518	A	K0RI	56,070	A	N7IR	23,430	A
W3TS	39,008	A	W4TMR	33,120	A	VE3DO	53,106	A	K5AM	32,630	A	N6OJ	11,767	A
N1TM	19,240	A	N4ROA	21,758	A	K9OM	44,073	A	NC7W	28,210	A	AA7UN	10,168	A
N2VPK	9,724	A	K4MJ	11,232	A	K8LUQ	42,036	A	K0FRP	28,188	A	K7SY	9,176	A
W2XL	170,016	B	W3EEE	139,040	B	WA8YRS	114,523	B	W0UO	124,821	B	K7CA	138,013	B
WA1LNP	167,854	B	N4CM	133,760	B	WA8TMK	107,712	B	WJ0M	115,192	B	N7GP	67,562	B
K1PX	140,800	B	W0AO	123,424	B	WA1UJU	93,340	B	K5KA	102,179	B	AH6M (K7SS,op)	58,362	B
K1HTV	129,750	B	WA4FFW	88,319	B	VE3OSZ	89,096	B	W5FO	86,163	B	WA2DFI	54,460	B
W2TZ	113,953	B	N2NFG	82,278	B	K9MMS	86,933	B	K0BJ	77,234	B	W6UC	52,736	B
K1ZM	383,180	C	AA4S	182,896	C	VE3EJ	291,593	C	N5JA	325,922	C	W7GG	156,046	C
N1BB	283,291	C	K0EJ	170,396	C	N4AR	249,400	C	K5NA	212,236	C	N6RO	122,672	C
KQ2M	264,276	C	K1KY	158,000	C	K8CC (W8MJ,op)	245,427	C	W0UA	190,432	C	N6SS	110,136	C
K3RR	234,616	C	AA4NN	146,124	C	K9DX	233,151	C	VE5RA	144,254	C	K6SE	84,688	C
W1SJ	179,655	C	K8OQL	143,724	C	KE9I	177,762	C	N0MA (W0EJ, op)	184,992	C	W7RM (KI7Y,op)	80,850	C
WW2Y	210,640	D	W4WA	325,066	D	WB9Z	311,472	D	N0NI	216,152	D	K7OX	88,627	D
K3WU	312,042	D	W4MYA	217,798	D	K8MK	300,195	D	NX5M	210,672	D	N7KE	86,904	D
K3SV	200,314	D	K4PB	130,310	D	K8KS	267,549	D	W0AH	198,832	D	KH7R	68,839	D
N2MM	189,240	D	WA4CBX	102,258	D	K8ND	238,452	D	W7CW	179,197	D	W7LR	66,456	D
W9XR	180,688	D	NT4D	82,875	D	W9RE	237,632	D	NA5B	163,125	D	W7AWA	64,440	D

Unlimited Category		
Frankford Radio Club	2,522,411	52
Medium Category		
Potomac Valley Radio Club	2,616,709	45
Society of Midwest Contesters	1,744,696	15
Yankee Clipper Contest Club	1,686,514	30
Mad River Radio Club	1,562,761	10
North Coast Contesters	1,077,180	10
Tennessee Contest Group	660,153	7
North Texas Contest Club	651,680	7
South East Contest Club	616,722	8
Oklahoma DX Assn	434,004	4
Kentucky Contest Group	386,522	8
Minnesota Wireless Assn	305,445	3
Northern California Contest Club	293,696	8
Central Arizona DX Assn	276,490	5
Rochester (NY) DX Assn	264,747	7
Salt City DX Assn	245,817	3
Texas DX Society	184,704	5
Willamette Valley DX Club	133,684	4
Western Washington DX Club	126,080	5
Southern California Contest Club	117,764	5
Florida Contest Club	110,233	4
Northern Lights Radio Society	55,495	3
Local Category		
Hudson Valley Contesters and DXers	479,074	5
West Park Radiops	83,732	4



year on the "Top Band" and my first contest entered as a single op. I didn't have much confidence in my little 1/4 wave inverted L, but after the contest I felt much better. I really enjoyed working 160 meters (KB8KIK). There were many fine signals out here again this year. KH7R's station was going like the Energizer Bunny. I could use their signal as an indicator of band conditions, but could not hear very many of the stations they were working (KH6/WB6FZH). I put the 160 meter module in the Argo just to check the band and found a contest under way. So I put the 80 meter feeders together into the tuner and jumped in. Most operators came back to my 5 W on the first call. It was really fun to work W7GG in Oregon (N2VPK). This is always a fun contest. Nice to work so many people on 160 meters. What a band! (KØWA)!. The first night band conditions were very good, with S1 or less noise levels. The second night was characterized with QRN due to storm activity. I didn't hear any stations from Florida, West Virginia, or Delaware (K16CK). I was surprised to have contacted as many stations as I did. My antenna is a half-wave dipole up at 15 ft. Worked about everything I heard. Now I'll roll up the 200 feet

of wire strung all around my house until next month. The neighbors might actually miss it. Nah. They've never appreciated my sense of beauty and style. Wire is beautiful (K5OY). Where was the DX? Even without the DX it was great fun (N4DGU). My first try at this contest. Thanks to Jim (VE5DX) for allowing me to put the station through its paces (VE5MX). I had a ball. There were great conditions. Special thanks to KL7Y for an all-time new one (VE2ZP). Conditions not as good as last year but I did break 1000 Qs for the first time (K0EJ). This was my first effort for this particular game. What a blast! The band conditions were excellent Friday into Saturday with more noise Saturday into Sunday. I found so many old friends during the contest that it seemed like a ham radio reunion (K1KY). This was a great contest, My big thrill was being called by WP2Z and being heard by RA0FF (K7CA). I decided to do a "nostalgia" contest this time and used my 20-year-old Drake C-Line barefoot. Remember when we could only run 100 W on 160? I'd forgotten how many knobs we used to turn! It was a great contest as usual (K5KA). I had a ball. There were many KH6s, and quite a few Europeans (VE2ZP). I had plenty of success running QRP this year. I added 14 new states (N0AX). This was a fun contest. My first 160 CW. I like it and will do it again (N5KB). The contest opened in a fury on Friday night. Murphy struck in the form of snow. DX was impossible for me on Friday, but conditions were better on Saturday. Thanks to everyone for my QSOs (K8FC). This is the first time I've operated 160 in over 25 years (N4ST). Fifty watts and a dipole can make for some good fun. Also having two KL7s call me sure got my heart pounding (N0HJZ). Who said CW was dead? There was lots of activity and fine operators (W9LNQ). This was a fun contest. I noticed there was not much DX activity. I am looking forward to next year (KN2T). It's amazing what you can do with 5 W on 160! (WX7G). Although conditions were definitely poorer than last year, we had a blast. DX was scarcer and weaker than in the previous 160 Meter Contests (K8KS). It was a thrill to operate this contest using low power (W5CWQ). I didn't do as well as past years, but had just as much fun (W4TMR). This is the first time for me to enter the 160 Meter Contest. I enjoyed every sleepless minute of it. See you again next year (W5FO). I ran QRP for the first time in a contest in 3 years. I couldn't believe the stations I worked and the fun I had. Everyone should try QRP once (WA8RCN).

Boat, wood stove, 1/4 wave vertical, balloon, and drink equals a fun weekend (WA7UQV). I only had a few hours to operate due to a family visit and my 3-month-old son who demanded some attention. See you next year (K3CV). At the age of 81, night contests are getting tough (VE4JB). The contest was a great event as usual (K7OA). I enjoyed great conditions during the contest, using 5 W and an end-fed longwire up 20 feet. I am amazed what I could work with meager power and a poor antenna (WA3VAT). Using a quarter-wave balloon antenna on Saturday night helped. I am not used to pileups (W0UY). I was impressed by the overwhelming majority that honored the DX window. Seems like it was kept much clearer than in years past. While conditions to Europe seemed down, propagation to the western states seemed quite good. Another fun contest (N4XD). Great contest. Each year my station is getting closer to the top 10 in the country (W2RE). This was my first

Scores are listed by DXCC Countries and ARRL/RAC Sections. Within each country or section, scores are listed in descending order, by power categories, followed by multioperators. Line scores list call sign, score, QSOs, multipliers, power (A = QRP, B = Low Power, C = High Power, D = Multioperator). Division leaders are listed in **bold**.

Asia										Europe										England										Denmark									
Japan										Balearic Islands										Italy										Netherlands									
JH2BGN						208	13	8	C	EABACC	588	21	14	C	GØKRL	40	5	4	B	OZ3W	900	25	18	C															
JA9XBW						4	2	1	C	IA6ACQ					ISVHO	630	21	15	C	PABCLN	2,150	43	25	C															
JH2ZHQ (JH1BBT,JK1GQ,ops)						6,500	100	33	D	IEI7M	16,192	184	44	B	OK1DWC	40	5	4	C	S58A	14,168	161	44	C															
JE1SPY	600	20	15	B		JA2YKA (JI4RDO,JL7JRQ,ops)	50	5	5	D	F5IN	6,080	95	32	C																								
JA7AM	96	8	6	B																																			
JA2MDG	2	1	1	C																																			
JA7NI	4,420	85	26	C	Asiatic Russia																																		
JL1ARF	1,932	46	21	C	RA0FF	532	19	14	B																														
JH4ADK	1,200	20	12	C																																			

W7TSQ 4,059 60 33 C
N7KE (UC2AFB,NG9C,W7HQJ,AC2K,
KB7N,W7QC,K7SZL,KB7V,W7VP,
KB7ZF,ops)

W7AWA 86,904 591 71 D
W7UQV (+N7NC) 64,440 443 72 D
W7UQV 61,110 426 70 D

Wyoming

A1BHZ/7 119,658 762 77 C
W7CW (+W7GS,WU7Y,N7VWV)
178,197 1063 83 D
W7CA (+K0HP) 72,450 519 69 D

8

Michigan

K8LUQ 42,036 336 62 A
W8RU 10,920 140 39 A
N8JM 2,392 52 23 A
K8SIA 45,304 403 56 B
K8VIT 38,700 291 56 B
N8EO 29,792 304 49 B
K8GW 18,900 210 45 B
K8GVK 15,916 173 46 B
K8BTI 15,523 179 43 B
K8BZ 11,778 151 39 B
N8VEN 10,668 127 42 B
W8WVU 7,232 113 32 B
K8AI 5,984 88 34 B
W8YL 1,320 33 20 B
K8CC (W8MJ,op) 245,427 1270 93 C
W8GP 40,078 344 58 C
W8KZM 22,232 194 56 C
W8EB 19,883 164 59 C
W8ROS 14,904 159 46 C
K8KS (+N8CC,K8AQM,N8BZ,W8MC,
K8BCO,K8AEM) 267,549 1272 101 D
K8FX (W8WA,K8GM,ops) 173,906 950 89 D

Ohio
W8VK 67,518 543 62 A
W8RCN 30,600 300 51 A
K8QUA 16,400 205 40 A
N8XA 11,115 122 45 A
W8BZWY 7,140 105 34 A
K8EE 2,000 50 20 A
W8BYS 114,523 805 71 B
W8TMK 107,712 745 72 B
W8EH 49,206 414 59 B
W8IDM 45,144 415 54 B
W8DHG 31,659 255 61 B
N8BQ 30,038 325 46 B
K8AB 16,562 166 49 B
W8PN 15,162 179 42 B
AF8C 8,680 124 35 B
N8CX 6,864 104 33 B
K8KSN 3,051 55 27 B
N8AA 121,200 750 80 C
K8MR 53,384 405 64 C
K8DI 50,344 400 62 C
K8SM 40,128 349 57 C
K5ZG 32,670 301 54 C
K8FTM 26,892 243 54 C
K8BK 17,204 187 46 C
K8MK (+K8LP,K8BE,K8ZD,W8BC)
300,195 1329 105 D
K8ND (+K1LT) 238,452 1249 93 D
N8NR (+N9AG) 183,128 1018 88 D
W8NC 20,570 184 55 D
K8NZ (W8KVU,K8BRE,W8KJ,K8CZ,
K8BFU,K8TQ,K8BI,ops) 8,234 88 46 D

Ohio

W8VK 67,518 543 62 A
W8RCN 30,600 300 51 A
K8QUA 16,400 205 40 A
N8XA 11,115 122 45 A
W8BZWY 7,140 105 34 A
K8EE 2,000 50 20 A
W8BYS 114,523 805 71 B
W8TMK 107,712 745 72 B
W8EH 49,206 414 59 B
W8IDM 45,144 415 54 B
W8DHG 31,659 255 61 B
N8BQ 30,038 325 46 B
K8AB 16,562 166 49 B
W8PN 15,162 179 42 B
AF8C 8,680 124 35 B
N8CX 6,864 104 33 B
K8KSN 3,051 55 27 B
N8AA 121,200 750 80 C
K8MR 53,384 405 64 C
K8DI 50,344 400 62 C
K8SM 40,128 349 57 C
K5ZG 32,670 301 54 C
K8FTM 26,892 243 54 C
K8BK 17,204 187 46 C
K8MK (+K8LP,K8BE,K8ZD,W8BC)
300,195 1329 105 D
K8ND (+K1LT) 238,452 1249 93 D
N8NR (+N9AG) 183,128 1018 88 D
W8NC 20,570 184 55 D
K8NZ (W8KVU,K8BRE,W8KJ,K8CZ,
K8BFU,K8TQ,K8BI,ops) 8,234 88 46 D

West Virginia

KVBS 34,398 351 49 A
K8CWL 6,700 109 33 A
K8KJF 81,608 606 67 B
W8WV 52,326 483 54 B
W8ZA 15,007 173 43 B
W8WEJ 14,696 155 44 B
K8OQL 143,724 830 84 C
K2UOP/8 26,871 243 53 C

9

Illinois

N9JF 70,856 518 68 A
K9OM 44,073 372 59 A
N9NK 25,728 268 48 A
W9PNE 4,060 59 35 A
K9MMS 86,933 557 77 B
K9LU 80,735 601 67 B
W9S 48,192 375 64 B
K9WA 25,012 239 52 B
K9PPW 20,800 200 52 B
W9LNU 20,300 200 50 B
W9CA 18,000 180 50 B
K9QVB 10,902 114 46 B
W9VTF 10,160 127 40 B
W9YS 2,392 52 23 B
K9DX 233,151 1219 93 C
W9BSKE 47,744 370 64 C
K9JO 45,008 333 60 C
W9QA 38,528 284 72 C
K9AB 15,953 146 53 C
W9BZ (+K9CS,K9NR,K9F,K9EF)
311,472 1431 103 D
N9OZ (+N1HRW) 168,299 926 89 D
K9BG 96,933 609 79 D
N4SI (+W9QA) 50,050 356 70 D
K9MOT 44,191 373 59 D

Indiana

W9UR 660 100 33 A
K9JC 74,088 510 72 B
K9PX 42,700 350 61 B
W8DSB 27,234 267 51 B
W9HLY 16,238 175 46 B
KE9I 177,762 1017 86 C
W9RE (+K9IG,N9RV) 227,632 1216 94 D
W9NO (+K9DAL) 105,867 643 81 D
W42KVX (+K9HIA,K9TFP,K9GAP,N29R)
44,226 408 54 D

Wisconsin

N9NE 41,202 327 63 A
W9IAB 5,460 105 26 A
W41UU 93,340 718 65 B

AF9DX 72,065 506 71 B
N9CK 46,023 332 69 B
K9DAF 33,489 273 61 B
N9CQ 23,540 214 55 B
N9WAR 10,836 126 43 B
W9DGVH 9,280 116 40 B
W9TG 148,434 947 78 C
K9NX 139,356 816 84 C
K9CAN 72,864 503 72 C
K9BS 45,698 307 73 C
W9ATZE 36,864 270 64 C
N9UA 31,130 283 55 C
W9GIL 28,428 200 69 C
W9AIH (K0TG,K9ALP,ops)
199,360 1087 89 D

0

Colorado

K0RI 56,070 396 70 A
K0FRP 28,188 243 58 A
K0BI 280 14 10 A
K0BDS 42,651 337 63 B
W0ETT 27,300 226 60 B
W9KV 15,810 155 51 B
W0AZ 2,592 48 27 B
N0KE 2,300 46 25 B
N0FC 176 11 8 B
W0UA 190,432 1019 88 C
W0TM 106,172 682 76 C
N0WTE 59,358 370 78 C
W0MU 42,560 301 70 C
N0HF 39,996 303 66 C
N0SXX 25,365 221 57 C
W0AH (+K7MD) 198,832 1081 86 D

Iowa

N0BB 57,794 404 71 B
W700 36,840 307 60 B
K0BCK 18,624 194 48 B
K0TV 8,840 108 40 B
W0B8 3,074 53 29 B
N0MA (W0EJ,op) 184,992 1116 82 C
N0NI (+W0DQ,W0FLS,N0AC)
216,152 1306 82 D
K0FT (+K9WM) 67,188 506 66 D

Kansas

K0BJ 77,234 517 73 B
K0RY 36,288 279 64 B
W0YXK 6,764 89 38 B
W0WPL 5,814 75 38 B
K0DG 5,580 90 31 B
N0BU 5,022 81 31 B
K0BU 2,208 46 24 B
W0UY 80,850 527 75 C
K0WA 77,400 533 72 C
N0IN 45,430 311 70 C
N0JO 168 12 7 C

Minnesota

N0UR 7,920 120 33 A
W0JM 115,192 742 77 B
K0IF 38,720 301 64 B
W0ZQ 33,062 271 61 B
N0HJ 20,800 200 52 B
K0B 1,633 34 23 B
W0HW 102,141 617 81 C
N0IJ 3,944 55 34 C
K0RB (+K5OT) 44,604 351 63 D
W0JH (W0SE,N0MR,KF0CI,K0BCS,
K0ROA,W0ENX,ops) 27,342 217 63 D

Missouri

N8TT 95,025 629 75 A
K0JPL 13,898 109 44 A
W0BQL 7,656 116 33 B
N8B8 105,825 704 75 C
K4VX 13,900 133 50 C
K0LIR (W0IYY,N0LIK,K0IA,W0BHH,
K0RAY,K0BKK,K0ZZ,W0IUN,K0GKP,
AA0A,ops) 147,926 995 74 D

North Dakota

N7IV 37,696 304 62 B
W7DO 45,658 301 74 C
K0IE 4,260 71 30 C

Nebraska

KK0DX 5,220 90 29 B
K0NC 3,360 56 30 B
W0JZ 864 54 16 B

Nova Scotia

VE1ZJ 57,054 318 74 C

Quebec

VE2ZP 98,364 557 84 B
VE2AWR 23,408 266 44 B

Ontario

VE3DO 53,106 501 53 A
VE3OSZ 89,096 581 74 B
VE3UZ 38,931 340 57 B
VE3TDG (VA3SYL,op) 31,490 325 47 B
VA3NR 21,840 226 48 B
VE3WZ 21,120 240 44 B
VE3BUC 1,100 25 22 B
VE3EJ 291,593 1330 103 C
VE3KP 149,345 856 85 C
VE3ZT 53,613 378 69 C
VE3ZTH 4,059 60 33 C

Manitoba

VE4AAU 14,202 130 54 B
VE4JB 45,359 337 67 C

Saskatchewan

VE5SF 10,368 108 48 B
VE5RA 144,254 851 83 C
VE5DX (VE5MX,op) 74,666 503 74 C

Alberta

VE6EX 49,088 382 64 B
VE6KC 11,792 134 44 B
VE6LB 13,428 137 49 B
VE6JY 23,336 172 65 D

British Columbia

VE7PT 35,750 266 85 C
VE7NSR (VE7QH,VE7CA,VE7CQK,
VE7ZED,VE7Y,VE7FGN,ops)
23,232 239 48 D

Checklogs

K2YLH, K0NY, SM5BFJ, W1OK.

W1AW schedule

Pacific	Mtn	Cent	East	Sun	Mon	Tue	Wed	Thu	Fri	Sat
6 am	7 am	8 am	9 am							Fast Code Slow Code
7 am	8 am	9 am	10 am							Code Bulletin
8 am	9 am	10 am	11 am							Teleprinter Bulletin
9 am	10 am	11 am	noon							
10 am	11 am	noon	1 pm							
11 am	noon	1 pm	2 pm							
noon	1 pm	2 pm	3 pm							
1 pm	2 pm	3 pm	4 pm							
2 pm	3 pm	4 pm	5 pm	Slow Code	Fast Code	Slow Code	Fast Code	Slow Code	Fast Code	Slow Code
3 pm	4 pm	5 pm	6 pm	Code Bulletin						
4 pm	5 pm	6 pm	7 pm	Teleprinter Bulletin						
4 pm	5 pm	6 pm	7 pm	Fast Code	Slow Code	Fast Code	Slow Code	Fast Code	Slow Code	Fast Code
5 pm	6 pm	7 pm	8 pm	Code Bulletin						
6 pm	7 pm	8 pm	9 pm	Teleprinter Bulletin						
6 ⁴⁵ pm	7 ⁴⁵ pm	8 ⁴⁵ pm	9 ⁴⁵ pm	Voice Bulletin						
7 pm	8 pm	9 pm	10 pm	Slow Code	Fast Code	Slow Code	Fast Code	Slow Code	Fast Code	Slow Code
8 pm	9 pm	10 pm	11 pm	Code Bulletin						
9 pm	10 pm	11 pm	Mdnte	Teleprinter Bulletin						
9 ⁴⁵ pm	10 ⁴⁵ pm	11 ⁴⁵ pm	12 ⁴⁵ am	Voice Bulletin						

W1AW's schedule is at the same local time throughout the year. The schedule according to your local time will change if your local time does not have seasonal adjustments that are made at the same time as North American time changes between standard time and daylight time. From the first Sunday in April to the last Sunday in October, UTC = Eastern Time + 4 hours. For the rest of the year, UTC = Eastern Time + 5 hours.

□ Morse code transmissions:

Frequencies are 1.818, 3.5815, 7.0475, 14.0475, 18.0975, 21.0675, 28.0675 and 147.555 MHz.

Slow Code = practice sent at 5, 7½, 10, 13 and 15 wpm.

Fast Code = practice sent at 35, 30, 25, 20, 15, 13 and 10 wpm.

Code practice text is from the pages of QST. The source is given at the beginning of each practice session and alternate speeds within each session. For example, "Text is from July 1992 QST, pages 9 and 81," indicates that the plain text is from the article on page 9 and mixed number/letter groups are from page 81.

Code bulletins are sent at 18 wpm.

W1AW qualifying runs are sent on the same frequencies as the Morse code transmissions. West Coast qualifying runs are transmitted on approximately 3.590 MHz by W6OWP, with K6YR as an alternate. At the beginning of each code practice session, the schedule for the next qualifying run is presented. Underline one minute of the highest speed you copied, certify that your copy was made without aid, and send it to ARRL for grading. Please include your name, call sign (if any) and complete mailing address. Send a 9x12-inch SASE for a certificate, or a business-size SASE for an endorsement.

□ Teleprinter transmissions:

Frequencies are 3.625, 7.095, 14.095, 18.1025, 21.095, 28.095 and 147.555 MHz.

Bulletins are sent at 45.45-baud Baudot and 100-baud AMTOR, FEC Mode B. 110-baud ASCII will be sent only as time allows.

On Tuesdays and Saturdays at 6:30 PM Eastern Time, Keplerian elements for many amateur satellites are sent on the regular teleprinter frequencies.

□ Voice transmissions:

Frequencies are 1.855, 3.99, 7.29, 14.29, 18.16, 21.39, 28.59 and 147.555 MHz.

□ Miscellaneous:

On Fridays, UTC, a DX bulletin replaces the regular bulletins.

W1AW is open to visitors during normal operating hours: from 1 PM until 1 AM on Mondays, 9 AM until 1 AM Tuesday through Friday, from 1 PM to 1 AM on Saturdays, and from 3:30 PM to 1 AM on Sundays. FCC licensed amateurs may operate the station from 1 to 4 PM Monday through Saturday. Be sure to bring your current FCC amateur license or a photocopy.

In a communication emergency, monitor W1AW for special bulletins as follows: voice on the hour, teleprinter at 15 minutes past the hour, and CW on the half hour.

Headquarters and W1AW are closed on New Year's Day, President's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving and the following Friday, and Christmas Day.

1998 IARU HF World Championship Rules

1) **Eligibility:** All licensed amateurs worldwide.
2) **Object:** To contact as many other amateurs, especially IARU member-society HQ stations, around the world as possible using 160, 80, 40, 20, 15, and 10 meter bands.

3) **Date and Contest Period:** Second full week-end of July. Begins 1200 UTC Saturday, ends 1200 UTC Sunday (July 11-12, 1998). Both Single- and Multioperator stations may operate for the entire 24-hour period.

4) Entry Categories:

4.1. Single Operator:
4.1.1. Phone only.
4.1.2. CW only.
4.1.3. Mixed Mode.
4.1.4. One person performs all operating and logging functions.

4.1.5. Use of spotting nets is not permitted.
4.1.6. All operators must observe the limits of their operators' licenses at all times.

4.1.7. Single-operator stations are allowed only one transmitted signal at any given time.

4.2. Multioperator, Single Transmitter, mixed-mode (only).

4.2.1. Must remain on a band for at least 10 minutes at a time.

4.2.2. Only one transmitted signal allowed at any given time.

4.2.2.1. Exception: Only IARU member-society HQ stations may operate simultaneously on more than one band, with one transmitter on each band/mode.

4.2.2.2. Only one HQ station call sign per member-society per frequency band is permitted.

4.2.3. All operators must observe the limits of their operators' licenses at all times.

5) Contest Exchange:

5.1. IARU member-society HQ stations send signal report and official IARU member-society abbreviation. IARU club station NUIAW counts as a HQ station. Members of the IARU Administrative Council and the three IARU regional executive committees will send "AC," "R1," "R2," or "R3" as appropriate.
5.2. All others send signal report and ITU zone.
5.3. A complete exchange must be logged for each valid QSO.

6) Valid Contact:

6.1. The same station may be worked once per

band/mode. Mixed-mode entries may work a station once per mode (but only in the generally accepted portions of that band for that mode. Note: Reworking a station in the phone portion of the band on CW is not permitted). Example: On any band, a station may be worked once on phone and once on CW (in the CW segment) for additional QSO credit. However, this counts as only one multiplier. Crossmode, crossband and repeater QSOs do not count. Where contest-preferred segments are incorporated in regional band plans, participants are requested to observe them.

6.2. The use of non-Amateur Radio means of communication (eg, telephone) for the purpose of soliciting a contact (or contacts) during the contest period is inconsistent with the spirit and intent of this announcement.

7) QSO Points:

7.1. Contacts within your ITU zone, as well as QSOs with all IARU HQ member-society stations, NUIAW, and IARU Administrative Council; and Regional Executive Committee members, count one point.

7.2. Contacts within your continent (but different ITU zone) count three points.

7.3. Contacts with a different continent count five points.

8) **Multipliers:** Total number of ITU zones plus IARU member-society HQ stations and IARU officials worked on each frequency band, with IARU officials representing a maximum of four multipliers per band: AC, R1, R2 and R3. (Note: HQ stations and IARU officials do not count for zone multipliers.)

9) **Scoring:** Multipliers times the total number of QSO points.

10) Reporting:

10.1. Entries must be postmarked no later than 30 days after the end of the contest (August 12, 1998). No late entries can be accepted. Any entry received after mid-October 1998 may not be received in time to be included in the printed results. Use official forms, a reasonable facsimile, submit entry on diskette, upload your entry to the ARRL BBS, or send your entry to ARRL HQ via Internet.

10.2. Electronic entries must conform to the ARRL Standard File Format, and should be sent via Internet to: contest@arrl.org

10.2.1. They may be uploaded to the ARRL BBS (860-594-0306).

10.2.2. They may be sent by mail.

10.2.2.1. Use an MS-DOS formatted disk, 3.5-inch (720-KB or 1.44-MB).

10.2.2.2. Diskette labels should clearly indicate the call sign used, contest name, entry class, and date of the contest.

10.2.2.3. Include one entry only on each diskette.

10.2.3. They may be sent by Anonymous FTP to: <ftp:arrl.org/logs/>

10.2.3.1 (If you use a non-Web-browser FTP client, FTP to <ftp:arrl.org> and change directory to /logs, with the command `cd /logs.`)

10.2.4. Logs received by FTP are not acknowledged by e-mail unless an e-mail message of inquiry is sent to: contest@arrl.org

10.3. Logs must indicate band, mode, date, time in UTC, calls and complete exchanges (sent and received), multipliers and QSO points. Multipliers should be marked clearly in the log the first time they are worked.

10.4. Paper entries with more than 500 QSOs total must include cross-check sheets (dupe sheets).

10.5. Contest summary, logs, and cross-check sheet (if required) or diskettes should be sent to IARU HQ, Box 310905, Newington, CT 06131-0905, USA.

11) Awards:

11.1. A certificate will be awarded to the high-scoring CW-only, phone-only, mixed-mode and multioperator entrant in each state, each ITU zone and each DXCC country.

11.2. Achievement-level awards will be issued to those making at least 250 QSOs or having a multiplier total of 50 or more.

11.3. Additional awards may be made at the discretion of each country's IARU member-society.

12) **Conditions of Entry:** Each entrant agrees to be bound by the provisions of this announcement, by the regulations of his/her licensing authority and by the decisions of the ARRL Awards Committee, acting for the IARU International Secretariat.

13) **Disqualification:** An entry may be disqualified if the overall score is reduced by more than 2%. Score reduction does not include correction of arithmetic errors. An entry may be disqualified if more than 2% of duplicates are left in the log. A three-QSO reduction will be assessed for each duplicate QSO found during log checking or for each miscopied call sign.

Prefix, Continent and ITU Zone

1A0	EU	28	8R	SA	12	CU	EU	36	H4	OC	51	LO-LW	SA	14,16	T33	OC	65	VP2	NA	11
3A	EU	27	9A	EU	28	CV-CX	SA	14	HA,HG	EU	28	LX	EU	27	T5	AF	48	VP5	NA	11
3B6-9	AF	53	9G	AF	46	CY	NA	09	HB,HE	EU	28	LZ	EU	29	T7	EU	28	VP8(F)	SA	16
3C	AF	47	9H	EU	28	D2,3	AF	52	HC,HD	SA	12	LY	EU	28	T8	OC	64	VP8	SA	73
3C0	AF	52	9I-9J	AF	53	D4	AF	46	HH	NA	11	OA-OC	SA	12	T9	EU	28	VP9	NA	11
3D2	OC	56	9K	AS	39	D6	AF	53	HI	NA	11	OD	AS	39	TA-TC	EU/AS	39	VQ9	AF	41
3D2(R)	OC	56	9L	AF	46	DA-DL,Y2-9	EU	28	HJ-HK	SA	12	OE	EU	28	TF	EU	17	VR2	AS	44
3D2(C)	OC	56	9M2,4	AS	54	DU-DZ	OC	50	HK0(M)	NA	12	OF-OI	EU	18	TG,TD	EU	11	VR6	OC	63
3DA	AF	57	9M6,8	OC	54	E3	AF	48	HK0	NA	11	OH0	EU	18	TI,TE	NA	11	VU	AS	41,49
3V	AF	37	9N	AS	42	EA-EH	EU	37	HL,DS	AS	44	OJ0	EU	18	TJ	AF	47	XA-XI	NA	10
3W,XV	AS	49	9Q-9T	AF	52	EA6-EH6	EU	37	HO-HP	NA	11	OK-OL	EU	28	TK	EU	28	XA4-X14	NA	10
3X	AF	46	9U	AF	52	EA8-EH8	AF	36	HQ-HR	NA	11	OM	EU	28	TL	AF	47	XT	AF	46
3Y	AF	67	9V	AS	54	EA9-EH9	AF	37	HS,E2	AS	49	ON-OT	EU	27	TN	AF	52	XU	AS	49
3Y(P)	AN	72	9X	AF	52	EI-EJ	EU	27	HV	EU	28	OX	NA	5,75	TR	AF	52	XW	AS	49
R1MV	EU	29	9Y-9Z	SA	11	EK	AS	29	HZ	AS	39	OY	EU	18	TT	AF	47	XX9	AS	44
R1MJ(FJL)	EU	75	A2	AF	57	EL	AF	46	I,IS0,IM0	EU	28	OZ	EU	18	TU	AF	46	XY-XZ	AS	49
4L	AS	29	A3	OC	62	EP-EQ	AS	40	J2	AF	48	P2	OC	51	TY	AF	46	YA	AS	40
4P-4S	AS	41	A4	AS	39	ER	EU	29	J3	NA	11	PA-PI	EU	27	TZ	AF	46	YB-YH	OC	51,54
4U(ITU)	EU	28	A5	AS	41	ES	EU	29	J5	AF	46	PA-PI	EU	27	RA-RZ,	EU/	19-26	YI	AS	39
4U(UN)	NA	08	A6	AS	39	ET	AF	48	J6-8	NA	11	PJ2,4,9	SA	11	UA-UI	AS	29-35	YJ	OC	56
4X,4Z	AS	39	A7	AS	39	EU,EU,EW	EU	29	JA-JS	AS	45	PJ5,6,7,8	NA	11				YK	AS	39
5A	AF	38	A9	AS	39	EX	AS	30,31	JD(Minami)	OC	90	PP-PY	SA	12,13	UJ-UM	AS	30	YL	EU	29
5B	AS	39	AP-AS	AS	41	EY	AS	30	JD	AS	45			15	UN-UQ	AS	30,31	YN	NA	11
5H-5I	AF	53	BV	AS	44	EZ	AS	30	(Ogasawara)			PY0	SA	13	UR-UZ,EM-	EU	29	YO-YR	EU	28
5N-5O	AF	46	BY,BZ,BT	AS	33,42,43,44	F	EU	27	JT-JV	AS	32,33	PY0(T)	SA	15	EO			YS	NA	11
5R-5S	AF	53				FG	NA	11	JW	EU	18	PZ	SA	12	V2-4	NA	11	YT,YU,YZ	EU	28
5T	AF	46	C2	OC	65	FJ,FS	NA	11	JX	EU	18	S0	AF	37	V5	AF	57	YV-Y0	SA	12
5U	AF	46	C3	EU	27	FH	AF	53	JY	AS	39	S2	AS	41	V6-7	OC	65	Y0	NA	11
5V	AF	46	C5	AF	46	FK	OC	56	K,W,N,	NA	6,7,8	S5	EU	28	V8	OC	54	Z2	AF	53
5W	OC	62	C6	NA	11	FM	NA	11	AA-AK			S7	AF	53	VA,VE,VO	NA	2,3,4,9	Z3	EU	28
5X	AF	48	C8-9	AF	53	FO(Clip)	NA	10	KG4	NA	11	S9	AF	47	VY		75	ZA	EU	28
5Y-5Z	AF	48	CA-CE	SA	14,16	FO	OC	63	KH0	OC	64	SA-SM	EU	18	VK	OC55,58,59		ZB	EU	37
6V-6W	AF	46	CE0A	SA	63	FP	NA	09	KH1	OC	61,62	SN-SR	EU	28	VK(LHI)	OC	60	ZC4	AS	39
6Y	NA	11	CE0X	SA	14	FR	AF	53	KH2	OC	64	ST	AF	47,48	VK9(W)	OC	55	ZD7-9	AF	66
70	AS	39	CE0Z	SA	14	FT8W	AF	68	KH3-7	OC	61	SU	AF	38	VK9(X)	OC	54	ZF	NA	11
7P	AF	57	CM,CO	NA	11	FT8X	AF	68	KH8	OC	62	SV-SZ	EU	28	VK9(C,K)	OC	54	ZK1-3	OC	62
7Q	AF	53	CN	AF	37	FT8Z	AF	68	KH9	OC	65	T2	OC	65	VK9(M)	OC	56	ZL-ZM	OC	60
7T-7Y	AF	37	CP	SA	12,14	FW	OC	62	KL7	NA	1,2	T30	OC	65	VK9(N)	OC	60	ZP	SA	14
8P	NA	11	CT	EU	37	FY	SA	12	KP1-5	NA	11	T31	OC	62	VK0(H)	AF	68	ZR-ZU	AF	57
8Q	AS,AF	41	CT3	AF	36	G-GX,M-MX	EU	27	LA-LN	EU	18	T32	OC	61,63	VK0(M)	OC	60	ZS8	AF	57

Straight Key Night 1997

All Hail That Glorious Mode

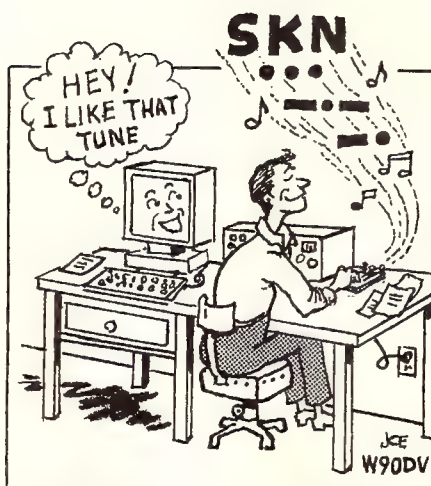
All hail that glorious mode,
That calls all brothers around the globe.
Creating the same cerebral itch,
Making fingers jerk and twitch,
And the bottoms of bands explode.
Tonight it's not that frantic fray,
They hear from day to day.
It's New Year's Eve
A slower pace does bode, my friend,
Another chance to pound the brass
And trip the light fantastic
Tis the eve of SKN!

—Hunt Turner, K0HT

The wonderful sound of “raw,” hand-sent Morse was again heard during Straight Key Night 1997. The straight key rhythm has a sound like no other. It is music to so many ears, and this year was no exception.

These days, when so much of the old is tossed aside, it is wonderful to hear the sounds of vintage equipment coming through the ether. Not only did folks dig through their junk boxes and dusty old storage shelves to find their trusty old straight keys, many of them found old boatanchor rigs and put them on the air for nostalgia's sake. It takes us back to a more relaxed era when people took the time to get to know each other. New friendships are started and old ones are rekindled. Dan, AE4AI, said, “There wasn't time to worry about going out on New Year's Eve, all the social activity was available on the ham bands. I had a great time.” John, W0AP, stated, “It was nice to hear human hands on the airwaves rather than the monotonous clatter of machine-sent code.”

In the 1997 SKN, we had 119 entries that added up to 1288 contacts. That translates to almost 11 straight key contacts per person. N5BF thinks that pounding away on your straight key is a good way to drum up business for the orthopedic doctors. The most-completed QSO award goes to Wayne, N2FX, for



pounding out 48 straight key QSOs. Michael, W2GR, was a close second with 43 contacts, and Doug, AB5YY, made 35.

Each year we ask the participants to vote for the best fist and most interesting QSO. When the votes for best fist were tallied, we had a three-way tie: Leland, W5KL; Robert, W3KW; and Joseph, K7CI. For the most interesting QSO there was a five-way tie: Puck, W4PM; Wayne, N1LZY; Leland, W4YE; Sam, K5SW; and Brice, W9PNE. Congratulations to all.

Key Clicks

This was my first SKN, and it was lots of fun (N0BZM). There seemed to be good participation in this year's SKN (NM0L). It was great to see all the activity. SKN is a very enjoyable time and I always look forward to it (N1WL). There was lots of activity this year. Maybe the straight key will replace the keyboard and keyers at this rate (K0LWV). This was my third year participating in SKN and I really enjoyed it. I started on 160 meters and never left this amazing band (W4QBE). The number of boatanchors on the air is increasing, and so is the age of the operators (K9VKY). I would like to express my gratitude to you for sponsoring SKN. I can't think of any better way to start off the New Year. The

only way SKN could be better is to have two of them each year (NT8X). This year's SKN was very enjoyable. I'm already looking forward to next year (WB8CFO). As usual a very worthwhile event. It should be kept alive because us OTs are getting fewer and fewer (W1YJ). This year's SKN was again a terrific success. It is amazing how this activity has attracted so many each year (W4YE). SKN is a nice mixture of nostalgia, relaxed operating, and the camaraderie of Morse (K1FP). Some great friendships are renewed or made during this party (W5KL). I am a new ham and I joined in on the fun of SKN this year. I received my Technician Plus ticket in August and upgraded to General in October. I'm a 19-year-old YL and enjoy ham radio very much. I have met so many nice people (KC7YVK). Another good SKN. No parties and no big hangover this year (W9ZEN). SKN has become a regular part of my New Year's holiday, and as expected it was a lot of fun (WB2AWQ). Once again the best night in ham radio has come and gone. I would like to add my thanks to the ARRL for sponsoring this event (AB5YY). I had a great time. Lots of nice people with very good fists. This year was more of a challenge for me since I used a 5-W QRP rig, but I found folks to be very patient and tolerant of my weak signal (N9EXY). SKN on 80 meters during New Year's Eve is a magical happening unmatched anywhere else in ham radio (NN7A). Well, my first SKN has come and gone. What a workout! You didn't tell me it would be this tough (W8EQA). What better way to greet the New Year than with old friends and manual Morse on SKN (W7HB). I had a great time and am ready for more (K3KEL)! There were friendly warm greetings from folks from Canada to Panama (K4MR). SKN has proven to be the premier event of the year (NICSD). Thanks for another great SKN. Of all the events that the ARRL sponsors, SKN remains my favorite (W4TVI). I sure enjoyed SKN this year. We should have more events like this. This is communication in its purest form (AA1KF).

QST-

Edited by **Steve Ewald, WV1X** • Assistant Field Services Manager

The ARRL Field Organization Forum

Field Organization Abbreviations

ACC	Affiliated Club Coordinator
ARES	Amateur Radio Emergency Service
ASM	Assistant Section Manager
BM	Bulletin Manager
BPL	Brass Pounders League
DEC	District Emergency Coordinator
DXFR	DX Field Representative
EC	Emergency Coordinator
LGL	Local Government Liaison
NCS	Net Control Station
NM	Net Manager
NTS	National Traffic System
OBS	Official Bulletin Station
OES	Official Emergency Station
ORS	Official Relay Station
OO	Official Observer
OOO	Official Observer Coordinator
PBBS	Packet Bulletin Board Station
PIC	Public Information Coordinator
PIO	Public Information Officer
PSHR	Public Service Honor Roll
SGL	State Government Liaison
SEC	Section Emergency Coordinator
SM	Section Manager
STM	Section Traffic Manager
TCC	Transcontinental Corps
TA	Technical Advisor
TC	Technical Coordinator
TS	Technical Specialist
VC	Volunteer Counsel
VCE	Volunteer Consulting Engineer
VE	Volunteer Examiner

owner of a new AC power generator and in the process of design and construction of a heavy-duty trailer in preparation for hauling it to Field Day. Speaking of Field Day, has your committee started working up plans for that event? It is just weeks away and will be here sooner than you think. Does your club or group have a pet project, fundraiser, or special event planned? Let's hear about it don't forget to give credit to the members who are involved. A recent SKYWARN presentation given by the National Weather Service from State College has added a number of new observers from the Schuylkill ARA and the Tamaqua Wireless Assn. The Del-Lehi ARC special event station WX3MAS during the Christmas Holidays was deemed a success due to the efforts of N3ULW, N3IGA, N3GXW W3TDF and K3YD. Clubs and Volunteer Exam teams are reminded to keep ARRL VEC up to date with your future exam schedules. Page 6 of the January issue of *Field Forum*, has a suggestion regarding the use for a nationwide Red Cross 2 meter simplex frequency of 147.42 MHz. How would our OES and county ECs feel about adding that operating frequency to our section's ARES system? May we take this opportunity to wish all a joyous Holy Easter season. Tfc: W3KOD 595, N3DRM 573, N3EFW 256, W3IVS 228, NR9K 172, W3IPX 55, N3NNH 50, N3HR 49, AD3X 44, WA3EHD 42, N3AT 32, W3NNL 27, W3BNR 24, WY3K 24, W3TWW 20, W3JXK 17, N3YSI 17, W3BTV 16, N3AO 15, K3ARRR 13, N3IRN 13, K3TX 12, W3YI 10, WA3CKA 9, K3ALVP 9, W3KAG 8, W8SC 8, N3AS 5, N3DCG 5, W3PD 3, W3BGCK 1. Net reports: EPA 354, EPAEP&T 161, PFN 130, PTTN 46, D6ARES 22, MARCTN 21, EPAS 11, LCARES 8, CCRAN 4, SCESN 4, SEPTN 2, D8ARES 2. Here's wishing all a good Easter Holiday season, de Harry W3KOD.

MARYLAND/DC: SM: Bill Howard, WB3V (wb3v@erols.com)—ACC: Tony Young, WA3YLO 301-262-1917. ASM: Jerry Gavin, NU3D 410-761-1423 (k2lq@aol.com). ASM/ RACES Coord: Al Nollmeyer W3YVQ (alyvq@juno.com). BM: Al Brown, WA3FYZ, 301-490-3188 (Al.Brown@ix.netcom.com). SEC: Mike Carr, WA1QAA (bamcc@erols.com) 410-799-0403. STM: Bruce Fleming 301-863-6582 (MEGASWOOP@aol.com). TC: Bob Bruninga WB4APR 410-553-6021 (bruninga@greatlakes.nadn.navy.mil) MDC Section web homepage www.erols.com/wb3v/mdc/. Please visit the MDC home page for all the latest links, information and more nets! ANAR EC N3QXW reports 49 members; 4 net sessions on 146.805, and no drills. The net sessions had 42 check ins; liaison with MEPN, BTN, WVA and MDD. Brian attended an Emergency Management Winter Storm Preparedness meeting on Dec 16. Several members participated in First Night Annapolis by collecting message traffic from the public and inserting them into the NTS. OES reports received from: N3QXW NU3D W3CA. ALLE EC KO4UU reports 12 members; 4 net sessions on 146.880 with liaison to MEPN, and one drill. BALT EC N3WD reports 38 members, 1 net session. Bill has held discussions with Salvation Army and has assigned AEC N3WKE as liaison to this organization. AEC N3JYO continues as liaison to ARC, and AEC N3VEJ has taken on responsibility for recruitment and training. OES report received from W3YVQ. CARR EC N3JIA reports 19 members, 5 net sessions on 145.410 with liaison to MEPN, MDD, MSN, BTN, WVTN, and DTN. KE3FL has designed a web page at <http://www.qsl.net/ke3fl> which contains current news articles, current event information of interest to ARES and RACES members. CARR ARES notified the Carroll County General Hospital that they would be available to provide communications for the Santa Net on 24 December. Rich has spent a good deal of time preparing an Emergency Operations Manual. ARES members will be completing the manual by making additions to it from information received during regular, future, sessions of the CARET net. With the Nets: NET/NET MGR/QND/QTC/QNI: MSN/KC3Y/31/67/313, MEPN/KE3OX/31/11/690, MDD/WJ3K/51/88/259, MDD TOP BRASS/W3YVQ/142/KK3F/113/K3JL/107, BTN/AA3LN/NO REPORT/, SMN/KE3OX/3/4/12, Tfc: KK3F 872, W3YVQ 110, WA3YLO 89, N3DE 79, KB3AMO 74, KC3Y 70, K3USO 69, KE3OX 50, N3WK 36, WA1QAA 26, N3EGF 22, N3WKE 20, KG6TU 18, N3JVE 5, N3XPX 4, KE3FL 1, PSHR: KK3F 172, W3YVQ 160, KG6TU 123, KC3Y 119, WA3YLO 114, N3WK 113, N3WKE 107, KE3OX 99, WA1QAA 94, KB3AMO 88, KJ3E 81.

NORTHERN NEW YORK: SM, Les Schmarmer, WA2AEA—ASMs: WB2KLD, N2ZMS, WA2RLW. ACC: WZ2T. BM: KA2JXL. OOC: N2MXX. PICs: N2SZK, WA2RXO. SEC/ SGL: WN2F. STM: N2ZGN. TC: N2JJK. January was quite a month for us all; ice, 6 counties across north; flooding, 2 southern counties. We had to reach out beyond Section and even Division lines, and hams came thru with flying colors. One lasting positive impact is future upgrades by many after seeing first-hand the value of HF. Three VHF ops active in Essex Co passed Gen'l written at Pibrg VE session on Feb 7. Expect to see more. VE Sessions: 3/28 Pibrg (WA2AEA), 4/4 Potsdam (NX2D, Glenn), 5/9 Tupper Lk (W2AFN, Al). CVAR Fest @ Clinton Co Fairground June 6. Club Officers: BFARC: KB2E, WA2RPF, KB2ZIE. NFARS: WB2GEI, KB2TBK, WA2MNC, K2CBT. BBS, B/P/T: KA2JXL 2403/442/44, KD2AJ 3563/793/68. Nets, QNI/QTC/ QND: BFSN 277/24/30, BILL'S GERITOL 490/0/4, CARRIER

661/46/25, CVARCCPN 18/0/4, CVARCSN 10/0/1, NDN 59/1/7, OVARC 57/2/5, Q NET 430/7/23, SIRR 572/41/31, JCRAC 296/25/27. 73, Les, WA2AEA.

SOUTHERN NEW JERSEY: SM, Jean Priestley, KA2YKN (@K2AA)—e-mail: ka2ykn@mosquito.com. ASM: W2BE, K2WB, W2OB, N2OO. SEC: W2HOB. STM: WB2UVB. ACC: KB2ADL. TC: W2EKB. SGL: KB2WKY. BM: KB2GNB. OOC: K2PSC. PIC/PIO: N2YAJ. TS: W2PAU, W2BE, AB2Y, K2JF, WB2MNF, KD4HZW. Rebirth of nature, public service events, and antenna parties are signs of Spring. Check with your EC for upcoming events. For those antennas, go to a club meeting and there should be willing volunteers to be found. I would like to present our new OO Coordinator, Jim, K2PSC. Mike, N2E, has to step down. Mike has done a good job of recruiting and encouraging new Official Observers. We wish him success in his business. We have lost a few clubs off the affiliated list. This means no report has been received for a few years. Be sure your club report is in. If a club is having problems, perhaps John, KB2ADL, or myself can be of help. I know there are many sections and to read the column for all of them would take time. But there is good information written on those pages. Just read a few each day. Tfc: WB2UVB 152, K2UL 110, W2HOB-4 78, WA2CUW 70, N2WFN 61, W2AZ 44, KB2VYZ 19, KB2VSD 19, KB2RTZ 14, KA2CQX 12, N2MSM 10, N2WXX 9, K2UL-4 8, N2FET 7, KB2JD 4, N2FHJ 4, KB2CDB 4, N2ZMI 4, KB2YBM 3, N2VQA 2, N2AYK KB2VSR KB2RH1 WB2CAK each 1. Total 638. Available VE testing, Jersey Shore ARS at American Vets Hall in Jackson, NJ. Contact John at 732-797-0485. Also testing in Bellmawr, NJ Contact Diane at 609-227-6281.

WESTERN NEW YORK: SM, William Thompson, W2MTA —APPOINTMENT: (PIO) KG2DI. CLUB NEWS: N2TSF MOARC Ham-Of-Year. 1998 OFFICERS: Liverpool ARC N2UXQ KB2SWN WA2DAD N2TAI KB2SWB N2TKX; MOARC KG2DI N2DLG WA2VCN N3DXJ; RAPS N2OYG KB2WPT WB2WQG N2SNL; Rome RC WA4BNY KB2TXR. SILENT KEY: W2CUY, at 94, early traffic relay station between Buffalo and Rochester after WW-1, former EC of Genesee Co. and longtime RACES net member with W2BGO. Recent Winter storms had many of our ARES, NTS and other operators active both here in WNY and in NNY section. THANKS to those listed here and ALL THE OTHERS from this Section that provided support: AA2CX K2BCL K2ZT KA1GEP KA2AON KA2GJV KA2ZNZ KB2FJS KB2KBY KB2KW KB2TIY KB2TRS KB2TXR KB2UQZ KB2VDG KB2VQW KB2WII KB2ZBJ KB2ZPG KB2ZPH KB2ZSV K2CBHM K2CBMJ K2CBYX KF1L KG2DI KW2M KY2F N2AGO N2DLG N2KPR N2LTC N2LWZ N2LXA N2MGU N2OJI N2OMZ N2QI N2SEZ N2TCR N2UXQ N2WDS N2XPG N2XTA N2YEK N2ZWO N2JNO N2A2 N2NH N2YV W2ABH W2BCH W2MTA W2RBK W2TQF W2VIV WA2IAX WA2JRR WA2PUU WA2UKX WB2JOW WB2NOG WB2TQG and WD2AFI; THANKS AGAIN TO YOU ALL! Jan. BPL: AA2CX KA2GJV KA2ZNZ N2LTC. HAMFESTS: LARC @ State Fairgrounds Syracuse April 25&26, STARC May 2, Rochester May 29-31, LARC @ Darien Center June 7, Cortland June 13, GRAM @ Alexander July 12, UARC @ Frankfort July 18, WNY Clubs Picnic July 26, TCARC @ Dryden Aug. 8, Rome @ Westmoreland Aug. 15, PROs @ Chaffee Aug. 29, MOARC Fly-in Breakfast @ Durhamville Hangar Aug. 30, Buffalo @ Hamburg Sept. 19, Elmira @ Horseheads Sept. 26.

Net	QNI	QSP	QND	Net	QNI	QSP	QND
EBN-FM, 6.730	599	000	022	INYS/EC-W	380	222	031
NYS RACES-SSB	041	004	002	OMEN-FM	029	001	002
NYS RACES-CW	014	001	004	WEST-FM/SSB	684	1506	015
INYS/SM-CW, 3677	256	155	031	ONEONTA-FM	038	005	004
CHN-SSB, 3925	255	104	031	TIGARDS-FM	030	002	004
WIDNM-FM	005	069	031	BRYSN-FM	297	006	031
INYPH-SSB	337	419	031	ICNYTN-FM	276	057	031
INYPON-SSB, 3925	353	261	031	IOCTENL-FM	577	164	031
ESS-CW, 3590	376	119	030	WIDNL-FM	438	047	031
NYSPT&EH-SSB	365	042	031	INYS/LC-W	215	132	031
IOCTEN-FM	1200	180	031	OMEN (Dec.)	024	001	002
STAR-FM, 6.073	444	046	031				
WDNE-FM	498	089	031				

Traffic (Jan.): N2LTC*1255, AA2CX*918, KA2ZNZ*650, KA2GJV*553, KF1L*402, W2MTA*346, K2BCL*345, W2G*202, W2FR*171, NN2H*158, WB2JH 127, KB2KOJ *117, AF2K*110, NY2V*109, WB2QIX*89, KA2DBD*73, KB2TIY*70, N2CCN*68, KG2D*52, AA2ED*41, N2JRS*78, W2PIL*36, KA2IWK*33, W4BNY*32, KA2DBD*30, N2OJI *30, KB2WII*73, K2DN*18, W2RH 18, KB2SCF 18, N2WDS*15, WA2UKX*9, KB2UQZ*9, K2DYB 7, N8JSO*7, KA2QIK 7. (Nov.) KB2SCF 4. (Dec.) KB2SCF 6. Datalink: K2DN RX=2 TX=2; KA2GJV RX=88 TX=51; N2LTC RX=347 TX=179; NY2V RX=0 TX=11; W4BNY RX=0 TX=4; Atlantic Division Cabinet meets in April to palaver, feed me Seymour! WNY Section Leadership Officials: ASMs: K2BCL K2DN K2EY K2MP K2OC K2ZR N2EH N2JAW W2BCH W2ZEG WA2UKX WB2YQH W2ZRN; ACC: N2GEH; BM: K2KWK; DECS: KA2ZNZ KF1L N2KPR N2OJM WA2UKX; NMs: AF2K (WDN/m), K2KIR (EAN), KA2ZNZ

ATLANTIC DIVISION

DELAWARE: SM, Randall Carlson, WB0JXX—The Delaware State Convention will be held on April 26, 1998 at the Nur Temple in Wilmington, DE. The convention is sponsored by the Penn-Del Amateur Radio Club. As in the past there will be an ARRL/Club leadership forum, conducted by Kay Craigie, Atlantic Division Director. Hope to see you all there. Many thanks to the First State Amateur Radio Club, for sponsoring the Delaware QSO Party again this year. The club hopes to make this a yearly event. The FSARC and AWARE clubs are again joining forces to offer testing in the Wilmington during most months of 1998. Kent County ARC is offering exams periodically as well. Many thanks to these clubs for their efforts in providing a significant number of testing opportunities in DE. Delaware traffic Nets can use your participation. DTM meets M-F at 1830 local on 3905 kHz. DEPN meets Sat at 1800 local on 3905. 73 Randall.

EASTERN PENNSYLVANIA: SM, Allen R. Breiner, W3TI—SEC: WB3FPL. STM: W3KOD. OOC: W3DZI. ACC: N3IGA. BM: WA3PZO. TC: K3DS. PIC: WB3DCL. ASMs: W3ZVX, K3TX, WY3K, N3KYZ. After fifteen years of faithful service, WB3JYY, EC for Carbon Co, resigned due to extra occupation responsibilities. WB2VBR has filled the void and accepted the appointment as their new EC. After 25 years of excellent service, the EC for Montgomery Co, W3EAG, has retired. His replacement, W3ZQN, accepted the appointment as new EC and placed W3CH in charge of operations and training officer. New club officers for 1998: RF Hill ARC, president N3PLI; vice pres N3XTG; secretary N3TZW; treasurer W3ZC. West Branch ARC president WQ3I, vice pres K3BM, secretary N3MGI, treasurer N3MFN. W3MDO and KN3DAO have been made life members of the Pocono ARK. Second call and last minute reminder, all League affiliated clubs should have received their League affiliation annual report forms by now. Did your club's judiciary remember to fill in the details and return them to HQ? Congratulations go to KB3BYR who is now a Tech Plus. N3JIO attained a milestone in his life when he received an Associated Science Degree in Electrical Engineering from the Community College of Philadelphia. The Southern Pennsylvania ARC is sponsoring entry level license instruction classes starting Apr 2. For registration, contact K6NJ at 898-8781. Their training program has 98 per cent graduation. Have you changed your call lately? WB3BOY is now N3ABC. The commercial broadcast station WCOJ is now owned by W3QT. K3NX is doing a fine job as the West Branch ARC's repeater fixer upper and an ardent user of packet. Members of the Southern Pennsylvania ARC have a program for recycling aluminum and paper to help fill the void in their club treasury. The Penn Wireless Assn is the

Continued on page 118.

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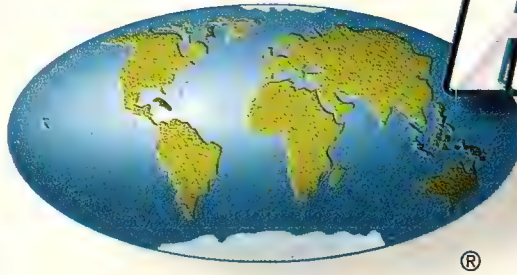
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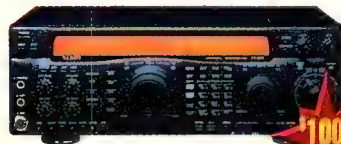
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- 100w 160-6M, 12VDC
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- 1000 Memory Scans
- 3 Antenna Connectors



IC-PCR1000 Communications Receiver

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- Wide Band Coverage: 100 kHz - 1.3 GHz **
- All Mode, Including CW
- Unlimited Number of Memory Channels
- Includes: IC-PCR1000 Communications Receiver, Software, Telescoping Antenna and Cable Lead, RC-232C 6-pin cable, 120V AC adapter and Operators Manual.

* Send away for your FREE PerCon Spectrum CD w/purchase of an IC-PCR1000. See your HRO dealer for details.

*This device has not been approved by the Federal Communications Commission. This device may not be sold or leased, or be offered for sale or lease, until the approval of the FCC has been obtained. **Coupon expires 3/31/98. Coupon on receivers good for blocked version only. * Cellular blocked: unblocked OK to FCC approved users.

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IC-706MKII



All Mode Transceiver

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- Enhanced 0.03-200 MHz Broadband All Mode Receive, 100 W HF + 6M/20W 2M
- Slots for 2 Optional Crystal Filters

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FULL CONTROL DTMF Mic!



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- 2 M/440 MHz
- 220 Memories
- 50 W VHF/35 W UHF
- PC Programmable

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- 2M/440 MHz
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- 9600 BPS Packet Ready
- CTCSS Encode/Decode
- 4 Power Settings per Band



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- 2 meters
- 50 Memories
- 50 W Tx
- Alphanumeric ID
- Superior Wide Rx (118-174 MHz)
- Rugged Aluminum Frame

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IC-T8A Tri-Band Transceiver

IC-T8A includes BP-199

COMING SOON

IC-T8AHP includes BP-200

- Switchable Tri-bander 6M/2M/440MHz
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- Tone Squelch with Pocket Beep

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IC-T7AHP Dual Band Transceiver



- Designed for Easy Operation!
- 2 M/440 MHz
- 4W VHF/3W UHF
- 70 Memories
- Great audio
- CTCSS Encode/Decode Included

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IC-W32A Dual Band Transceiver



- 2 M/440 MHz
- 5W @ 13.5 V
- Simple Operation (No Function Button)
- Crossband Operation
- 200 memory channels with easy alpha naming
- VHF/UHF exchange function
- Unit to Unit/Computer to Unit Cloning Capabilities

\$100 **Coupon

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- Wide Band Coverage - .5-1300 MHz **
- All Mode: FM, WFM, AM, USB, LSB, CW
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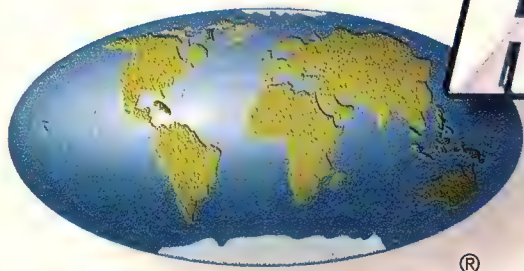
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- TS-50S - World's smallest HF trans.
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- 5W Opt., DTSS Built-In
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- Encode Built-In

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- RCP2 Radio Control Program Compatible

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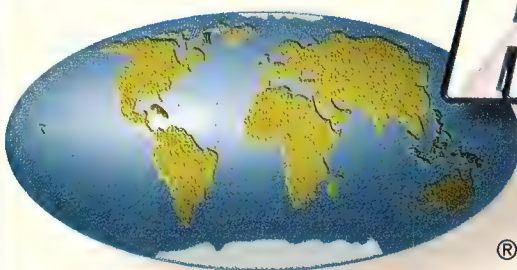
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- 100W 160-10 Mtrs • 10W 6M, Gencov. Rx
- Full QSK, 100 Mems. • Compact, Remotable
- Dual VFO, 12VDC • 6.2 lbs.

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100W 6m
DX-70T**

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SMA-501 Dual Band

Dual band "Miracle Baby" style antenna, with a male SMA connector.

Shown on the popular FT-50R by Yaesu. The antenna is only 1.75 inches tall, and exhibits surprising performance.



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SBB-1/SBB-1NMO 2M/70cm

Dual band Mobile Antenna with flexible whip..

The perfect antenna for high profile vehicles. The heavy-duty whip bends to enter garages, drive-thrus, etc.



Available with a PL-259 connector (SBB-1), or an NMO connector (SBB-1NMO).

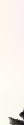
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Very Flexible!

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Dual band 2M/70cm mag mount antenna with 12' RG-58/U coax.

Antenna whip unscrews from the magnet for easy storage and transport.



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40/20/17/15/10/6/2 Meter mobile ant.

Designed for use with the ICOM IC-706, and ALINCO DX-70. The CA-HV is tuned for constant operation on 6-2M. To operate HF, simply screw on 1 or 2 HF coils for quad-band operation!! The CA-HV is easy to mount on a standard trunk lip, hatch-back etc. type of mount. It folds over, too.

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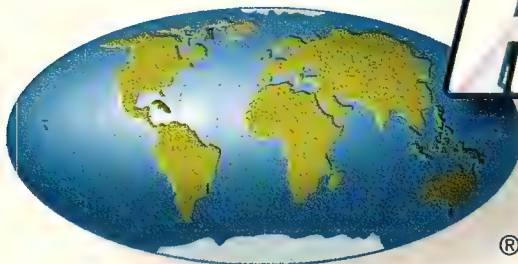
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Construction: Single-piece fiberglass

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Wave: 146MHz 5/8 wave x 2 • 446MHz 5/8 wave x 5 • Max Pwr: 200W
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Wave: 52MHz 5/8 wave x 2 • Max Pwr: 500W • Length: 21'8" • Weight: 5lbs. 11 ozs.
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Construction: Fiberglass, 2 Sections

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(OCTEN), KB2TIY (W0N/I), N2JRS (W0N/e), N2LTC (NY Phone), N2NCB (STAR), W2FR (TCC), W2MTA (2RN), W2PUU (CNYT); OOC: K2DYB; PICs: KB2UQZ & W2PUU; SGL: N2KYZ; STM: KA2GJV; TCs: K2QR & W2VUO. 73, it's Spring!

WESTERN PENNSYLVANIA: SM, Bill Edgar, N3LLR—ASM: N3MSE. ASM-ARES: WB3KGT, SEC: N3SRJ. ASM-Packet: KE3ED. STM: WB3KPE. TC/OOC: WR4W. BM: KC3ET. ACC: AK3J. PIC: W3CG. Rich Beaver N3SRJ has been appointed as the WPA Section Emergency Coordinator. Rich has been involved in a number of ARES positions and has a very good working knowledge of the ARES program. I'm very pleased to have Rich's help as the SEC. Please join me in wishing him the best in his new position. The WPA Section Club President's Conference and WPA Emergency Coordinator's Conference will be held during April 25th and 26th at the Butler Days Inn Conference Center on Route 8. The Club President's conference will be held from 8:30 AM to 5:00 PM on Saturday, April 25th. This conference is open to 2 representatives from each amateur radio club. Planned topics are: Getting young people involved; Club growth and retention; Club Newsletters; ARRL Resources; Club reports; and Awards presentation. There will be several roundtables or workgroup discussions. The Atlantic Division Vice Director, Bernie Fuller, N3EFN, will be giving us an update on the ARRL HQ and Atlantic Division. The Emergency Coordinator's conference will be held from 8:30 AM to 5:00 PM on Sunday, April 26th. This conference is open to AECs, ECs and DEC's. (There is a limit of 50 participants and priority will be given to ECs and DEC's in registration.) Planned topics include: SET review; Working with volunteers; Packet weather alerting system; Newsletters; SKYWARN update; ARES unit reports; roundtable/workgroup discussions; and a Red Cross update (an invitation has been extended to the new Red Cross PA State Disaster Specialist). Please send reservations for either meeting by sending it to Bill Edgar, N3LLR, by phone, letter or e-mail. The contact information is listed in the front of the QST. Cutoffs for reservations are Monday, April 20th at 7:00 PM. Has your club renewed its ARRL affiliation? If you need the paperwork or help in renewing, please let Stew Saylor AK3J know. Stew is our section's Affiliated Club Coordinator and our expert on club matters. January 1998 Station Reports: Station, QTC; W3OKN * 253, N3ON 95, W3NGO 86, W3AUNX 85, W3GJ 57; N3COR 57, N3WAV 34, W3BKP 32, N3KB 32, W3QNT 18; N3PBD 16; KC3NY 14; KB3IN 2. * PSRR 1/60 2/24 3/24 4/2 6/20 Total 130. January 1998 Net Reports: Mgr, QTC, SESSIONS; WPA Phone Net 116; WPA CW Net 110; WPA2MTN 75; NEPA2MTN 37; ERIE Mailbag Net 114.

CENTRAL DIVISION

ILLINOIS: SM, Bruce Boston, KD9UL—SEC: W9QBH. SGL: WA9AON. ACC: N9PK. STM: KG9NP. PIC: N9EWA. TC: N9RF. OOC: KB9FBI. Severe weather season is upon us. If your club doesn't sponsor weather spotter training classes, contact the local National Weather Service office to schedule a training session or to find out when they will be offered in your area. The York RC has voted to purchase a vinyl banner to display at public service event such as parades and Field Day. The banner will have the club logo and a message to indicate they are an Amateur Radio public service. The club felt the banner would better identify the club and highlight its participation in civic events. The new officers for the YRC are pres KW9L, vp KG9LT, sec N9PVO, trea KB9FU. The Egyptian RC reports the local ARES team has received recognition from the Madison Co Board of Supervisors for its constant service and support. The certificate of appreciation was accepted by Madison Co ARES EC KB9AIL. Assistant EC KD9SG also received a letter of recognition for his work as team leader on the renovation of the Madison Co Mobile Communications Van. Local Amateurs devoted more than 500 hours to the project. The van was placed into operation last October for an inter-agency drill involving 5 trauma centers, 8 fire and rescue companies, 7 ambulance services, Illinois State Police, Madison Co Sheriff's Dept., and the Hamel Police Dept. New officers for the Metro ARC are pres W9MNF, vp W9FO, sec W9LYA, trea W9KFC. The Starved Rock RC conducts an ARES net every Sunday at 7 PM on 147.12 MHz. Newsline can be heard on the SRRC net each Wednesday at the same time and frequency. The SRRC is discussing the possibility of forming a coaching team to help foster growth within the hobby. The team would contact schools, community organizations and other institutions to recruit prospective Amateur Radio operators. Additional information on the coaching team concept can be found on the ARRL Website at www.arrl.org/fieldclub/coaches/ and in QST. Lewis & Clark Community College in Godfrey will be offering classes for the no-code Technician license. The instructor will be N9WHH. For more information call the college Enrollment Center at 618-467-2222. The 1998 officers for the Fox River Radio League are pres W9AN, vp KB9ONM, sec KD9XP, trea W9FSE. A humorous note from the "I never thought of that" department: N9RF, our section's Technical Coordinator (TC), works to resolve a variety of equipment problems for hams and non-hams alike every month. In his latest report, N9RF tells how a non-ham asked why his color printer no longer worked on colors, but worked fine on black and white. The TC suggested to the individual that he replace the empty color ink cartridge, and that solved the problem.

Net	Freq	Time (Local)
ISN	3.905	1800 Daily
ILN	3.665	1830 & 2200 Daily
ITN	3.680	1900 Daily
CTN	147.090+	2100 Daily
IL ARES	3.905	1630 1st & 3rd Sunday
Macon Co	442.250+	2100 Wednesday
IEN	3.940	0900 Sunday
IPN	3.855	1645 M-F; 0830 Sunday
NCPN	3.912	0700 Monday-Saturday
NCPN	7.270	1215 Monday-Saturday

January traffic: W9VEY Memorial Net de K9AXS 8 with 233 check-ins. K9CNP 182, W9HLX 88, N9SF 80, WB9TVD 36, N9DT 35, NC9T 18, K9IMX 17, W9FIF 5, WD9MI 2. ISN via WB9TVD QNI 251, QTC 69 IN 29 sess, ILN via K9CNP QTC 62 IN 23 sess, ITN via K9FME QTC 23 IN 26 sess,

NCPN via W9OUF QTC 60 IN 27 sess, IPN via K9ACY. QTC 12 IN 25 sess, IEN via K9HEZ QTC 4 IN 4 sess.

INDIANA: SM, Peggy Coulter, W9JUU—SEC: K9ZBM. ASEC: WA9ZOE. STM: AA9HN. OOC: KA9RNY. SGL: WA9VQO. TC: W9MWY. BM: KA9QWC. Sympathy extended to the families and friends of Silent Keys: 10/16/97, Dennis D. Smith, N9FOT, Carlisle; 12/6/97, Frances Ganser, KA9RGS, South Bend; 1/15, John S. Green, KB9IWF, Lebanon; 1/21, Dorothy Valentine, N9FND, Darlington; 1/28, C. Clifford Durr, W9KLG, Muncie; 2/6, Stanley Kalberer, W9BYS, Washington. As hamfests are around the corner, this is a warning to be careful what you buy and who you buy it from. At a hamfest late last year someone sold radio gear that had been dismantled so that it would never work as it was. This person gave a fictitious name and address. He had not even registered with the hamfest committee. Just beware. Congratulations to Vicki Rudicel, KB9OME received the Ham of the Year award at Grant Co ARC at Marion also Don Evisizer, KA9QWC receiving the same award from Whitney Co ARC. If your club awarded an amateur of the year to a member why not send their qualifications to the Indiana Radio Club Council nominating them for the IN of the Year award. It is always awarded at the Indianapolis Hamfest in July. You can send the letter to me and mark on the envelope "Amateur of the Year". The SEC would like to extend a special "Thank You" to Linda Wyatt, N9IOD, EC for Huntington Co. for sending him four Public Service Activity reports. Also to EC's sending their Annual EC reports. They were KA1LXG, N9ADS, N9YNF, N9IOD, WB9UNL, N9LPX and WB9NCE. Happy Easter to all. NM's ITN/W9UMH, QIN/WB9TUS, ICN/AA9HN, WN/AB9AA, VHF/AA9HN, BBS/WJ9U.

Net	Freq	Time/Daily/UTC	QNI	QTC	QTR	Sess
ITN	3910	1330/2130/2300	2440	431	1353	62
QIN	3656	1430/0000	375	154	1170	60
ICN	3705	2315	no report	—	—	—
IWN	3910	1310	2390	—	310	31
IWN VHF Bloomington			435	—	465	31
IWN VHF Kokomo 709			—	155	31	—
IWN VHF Northeast			929	—	620	31
Hoosier VHF nets (13 nets)			944	81	1535	83

D9RN for Dec QTC 492 in 62 sessions IN represented 100 % by K9GBR, W9UEM, KA9MSR, KA9DIG, WB9QPA, N9ZZD, KG9LI, KB9NTV. 9RN Jan. QTC 223 in 62 sessions represented by KG9LI, KO9D, WB9TUS, WB9UYU, WA9QCF, AA9HN, and W9FC. Tfc: W9FC 231, N9ZZD 132, WB9TUS 119, W9UMH 89, KO9D 87, WB9QPA 82, AB9AA 72, K9PUI 66, K9GBR 56, AA9HN 54, W9UEM 52, W9JUU 42, WA9QCF 39, KA9QWC 35, KA9DIG 23, KA9EIV 23, N9WNH 21, K9RPZ 18, W9CSJ 17, KA9DIY 16, KB9NPU 12, KO9IM 10, W9EHY 6, AB9A 4, W9RTH 4, WB9NCE 3, N9JAI 3.

WISCONSIN: SM, Roy A. Pedersen, K9FHI—SEC: WB9SMM. STM: KA9KLZ. ACC: KF9ZU. SGL: W9RYA. OOC: W9RCW. PIC: K9ZZ. TC: K9GDF. ASM: W9CBE, K9UTQ. BM: WB9NRC. Cedarburg Swapfest May 2 Circle B Recreation Center. Racine Megacycle Club swapfest July 26 at South Hill Country Club. KC9ZL, a longtime member of the BWN, is a Silent Key. W9XY recently received his RO/UR8LV (Siberia). It was his last one to make the grade for the "160M WAZ award with a total of 30 out of 40 zones, he should be getting certificate #124. Hope you guys are enjoying the winter. W9YCV has had contacts on 6 meters with Idaho and Colorado (Hamtrix). 9th region C4 had good representation from Wisconsin—the stations are N9KHD, K9LGV, W9YCV, W9CBE, N9CK and W9UW, thanks for all your help. KS9WI is the new call for Keith ex N9NOF, W9EME is the new call for Jim ex KD9PW (Badger Contesters). I regret to report W9DOW a Silent Key. KB9PNC is now W9TCH. KB9GUX upgraded to general. WD9HXC upgraded to advanced. Tom and De-Ann Davis took a trip to Texas, and was mobile on 2 meters and talked with his brother in Albuquerque on a 2 meter link over 200 miles away (Short Circuits). Forever wedding cake: 1 rounded cup of true love, 1 heaping cup of perfect gift and confidence, 1 pinch of unselfishness, a sprinkle of interest in all she does. Mix all ingredients with a pint of sympathy. Flavor with a bright fireside and loving care. Bake well all your life. (Claris, N9ISB, Uff da north). I need articles for this column fellows and gals, please. I may not get it in on the month you send it, but it will be there later. I hope everyone will have a good summer, lots of camping, fishing and good camaraderie. Thought for the day: You can't have everything! Where would you put it? Tfc: W9IHW 752, K9JPS 744, WB9JSW 710, W9RCW 688, WB9YYP 348, K9FHI 257, W9CBE 177, N9KHD 158, W9YCV 99, AG9G 87, KA9KLZ 77, N9CK 75, N9BDL 72, KE9VU 55, K9RTB 44, KA9BHL 43, KB9G 38, KA9FVX 38, K9GU 34, K9LGU 34, K9HDF 33, W9UW 31, WD9FLJ 19, WB9ICH 17, N9JY 15, W9ODV 12, W9PVD 4.

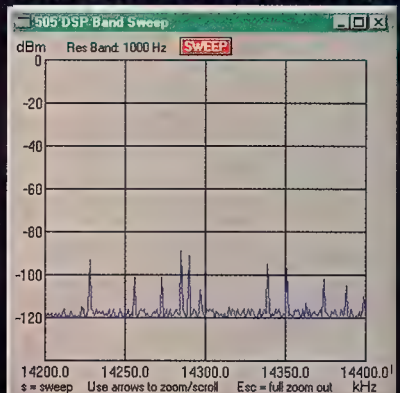
DAKOTA DIVISION

MINNESOTA: SM, Randy "Max" Wendel, N0FKU—Former FO member, Stan Brock, WD0BGS, suddenly found himself packing in Feb for his move this spring to Tennessee as a salesperson for Ten-Tec. This is quite a change for Stan and we wish him the very best in his new environment. Stan, keep in touch! The Blufflands group in SE MN held yet another great exercise in late January east of Rochester. A plane carrying a transplant organ crashes and survivors get separated seeking help. Using K-9 SAR teams and Mayo One helicopter, victims and organ were located and transported to Rochester. Great job folks! Rochester ARC reports new duplexers on 146.82 are inline. Don't forget their hamfest on April 25 at same new location as last year at Graham Arena on city's south side at fairground. Waseca ARC reports their 2m net is Sat nites at 9 PM on 146.94. St Paul ARC and the 33's club reports Twila, N0JPH, and Don, N0JPG, Greenheck will maintain HF contacts while visiting the central Americas from late Feb to early April. St Cloud ARC reports possible new hamfest site this year at Apollo School. Watch for details. Red River ARC reports Ham of the Year for 1997, winning the "big tube" award was Mark Kerkvliet, KG0FR, presented to him at his Xmas party. Folks, thanks for sending me your club newsletters! On a sad note, we report SK Bernard "B.J." J. Arts, W0TN, of Hibbing (previously of Twin Cities). BJ was a member of the FO, MARS, ARRL and AMSAT, and was only 37 yrs old. Also broadcasting SK are WCCO Ch.4 Dave Moore who was given wonderful tribute at his death in early Feb, and WCCO AM-830 was engineer Jim Erickson, 66, in Dec, and

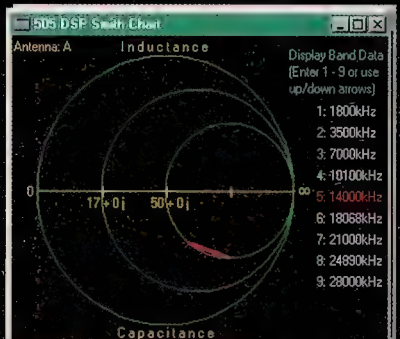
"The 505DSP, which eschews replicating 'clunky' knobs and buttons in its user interface, might well foreshadow the perfect marriage between Amateur Radio and the computer" -QST Magazine

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If your present radio had a 15" LCD display, maybe it could come close to the convenience and features of the 505DSP. But the 505DSP is more than a conventional radio with add-on computer control. It was designed from the ground up for computer operation. Here are some examples of what sets us apart from the other rigs.



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Kachina Logbook: klog9701

Logbooks	Entries	Print	Help	Quit!
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002	01 Apr 97	17:53	14,187.000kHz	US
003	01 Apr 97	17:54	3,933.500kHz	LS
004	01 Apr 97	17:55	1,877.000kHz	LS
005	01 Apr 97	17:56	7,040.500kHz	CW
006	01 Apr 97	17:58	14,012.000kHz	CW

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16/24 Bit DSP/DDS Performance In addition to 100% computer control, the Kachina 505DSP offers exceptional 16/24 bit DSP/DDS performance. IF stage DSP, "brick-wall" digital filtering, adaptive notch filters and digital noise reduction, combined with low in-band IMD and high signal-to-noise ratio, produce an

excellent sounding receiver. Sophisticated DSP technology achieves performance levels unimaginable in the analog world. The transmitter also benefits from precise 16/24 bit processing. Excellent carrier and opposite-sideband suppression is obtained using superior phasing-method algorithms. The RF compressor will add *lots* of punch to your transmitted signal without adding lots of bandwidth, and the TX equalizer will allow you to tailor your transmitted audio for more highs or lows.

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Minnesotan Otto Schmitt, 84, (best known for his Schmitt Trigger circuit). In closing, next time you hear an unfamiliar call sign on your local area repeater, pick up the mic and introduce yourself. If you have ever traveled thru unfamiliar territory it's nice to know you have a friend (fellow ham) to converse with during your journey. Also, on HF we need to set examples and operate with professionalism and respect to others on the bands. Let's all do our part to keep our bands from slipping into the chaotic, unruly, and embarrassing condition it often seems to be at times. 73 N0FKU. Public Svc: WB0WJN, KB0AII, WA0TFC, W0GRW, W0LAW, W0HPD, W0DA, K0PZ, KB0AIJ, KN9U, W3FAF, K0WPK, KB0OHI, W0DGF, N0JP, N0AU, K0OGI.

NORTH DAKOTA: SM, Bill Kurti, WC0M—35th Peace Garden Hamfest July 10-12. All the usual planned activities. Bring the entire family for a weekend of camping in the Turtle Mts. I was pleased to see the Grand Forks flood article in February QST. That ordeal saw ham radio operators at their very best. Not much more can be said except a very big thank you from all ham operators to the fellows and gals in Fargo and Grand Forks and to the hams involved in the statewide Salvation Army effort. The ground-work and preparations made over the years paid off this spring. I had to have back fusion surgery in December. We decided to get away from the ice and snow and went with our RV to Arizona to live the snowbird life for a couple of months. This week, we have been taking in the Good Sam Campout, 5 miles south of Quartzsite. Net reports by KE0XT, net manager, Goose River 9 PM, Sunday, 1895 kc 4/69/0: DATA 3937 kHz, 6 PM daily 31/866/9; Wx net 8:30 PM and 12:30 PM M-S 62/1369/65.

SOUTH DAKOTA: SM, R. L. Cory, W0YMB—Plan to attend the Dakota-Midwest convention at South Sioux City, NE, on May 30-31. South Dakota HF awards manager is Norm, WA0PNB and for VHF/UHF Bill, WA0TDK to check your cards for VUCC awards. Huron Club is sending code practice on 147.09 at 7:30 PM Sunday nights. They also held a raffle to raise funds for a framed print and it was a sell out. They set up a station in the mall to create interest in their license class. They will be testing on June 13 and Sept 26. At Rapid City, testing will be held on Aug 8 and Dec 12. As of Nov 30, 1997, South Dakota had 185 Extras, 306 Advanced, 355 Generals, 283 Tech Plus, 365 Techs and 143 Novice class. N0MEA reported Dec was the best month in over a year with 47 checkins to the novice net, however, a drop in the SKYWARN net. Regret to report Silent Key WB0YCM, Carl Bates. Mobridge ARC held their annual Christmas party on Jan 9. Sioux Empire ARC at Sioux Falls was successful in having ham antennas removed from a proposed city tower law. Jan had some good DX openings on the 10-15-20 meter bands. Tlc reported for Jan 901.

DELTA DIVISION

ARKANSAS: SM, Roger Gray, N5QS, e-mail n5qs@arri.org — While writing this month's report I am sitting at my radio listening to the School Club Roundup operations at Harding University, N5HU, and Arkansas State University Beebe, W5ASU. I want to commend the sponsors of the school clubs around the section and those who have spent many hours organizing the stations for the contest. This activity exposes many students to our hobby and will hopefully bring in some new blood. During some club meetings I have overheard discussions of lack of interest in operating events. Some of the lack appears to stem from the lack of new operators who aren't tired and want to get out and work on some of the projects that we all once enjoyed. I miss the participation in events such as Field Day that we held with a large group of new hams and their families. I counted the Novice and Tech Plus operators in our club at the last meeting. Out of 100 plus members, there were less than 10. This indicates to me that we need to promote our hobby to those who will keep it energetic and keep the family oriented activities going. As you read this it is time to start promoting Field Day to the public. Be sure to contact your local schools before the end of the spring semester and have them announce this as a possible summer activity for their students. Please contact your County Judge and OES coordinator and all the Mayors in your area and invite them to your Field Day activities. Tlc: KF5YV 136, W5QU 48, K0SE 10, K7ZQR 9, KA5MGL 8, W5HDN 7, KB5ZU 4.

LOUISIANA: SM, Lionel A "Al" Oubre, K5DPG, e-mail k5dp@arri.org Web Page www.aisp.net/k5dpdg ASM: KB5CX. ACC: KA5JU. BM: K5ARH. TC: KE5FZ. SEC: KA5YDJ. OOC: WB5CXJ. PRC: KB5QVI. STM: KG5GE. NM LTN: WB5ZED. NM LSN: WB5CDX. NM LCW: W4DLZ. I have been reflecting back on the past six years that I have had the pleasure to serve as your Section Manager. As my fourth term of office begins, I wish to thank the members for contributing to the ARRL Field Organization and the many public service activities. The respect for the job done by amateur radio operators continues to grow in every section of the state. Each of us has to remember that all of the programs sponsored by the ARRL are open to all licensed operators, but to hold a leadership position or a field appointment requires that a person be an ARRL member and maintain their membership. From time to time appointments will be canceled when a person chooses to leave the League. I ask that everyone do what we can to promote Amateur Radio and put our differences aside. New club officers: AARA Pr NQ2V, VP KN5GRK, Sec K5DPG, Tr K5ARH. Up coming hamfest: Baton Rouge May 1 & 2, Slidell July 18. Louisiana Section Net Schedule: LTN 6:30 PM, local 3910 kHz, nightly, WB5ZED mgr. LCW 6:45 PM, local 3673 kHz, nightly, W4DLZ mgr. LSN 8:30 PM, local 3713 kHz M-F, WB5CDX mgr/KK5WG Asst. Reports for Dec 1997: LTN QNI 345 QTC 97 sess 31; LSN QNI 84 QTC 16, sess 22; LCW QNI 137 QTC 63 sess; PSRR: KG5GE 106, WB5CXK 112, K5WOD 116, WB5CDX 117, K5IQZ 120, K5DPG 139, WB5ZED 147, K5MC 215. Tlc: WB5CXK 2, K5WOD 11, N0KWA 12, K5DPG 18, KG5GE 46, W4DLZ 87, K5IQZ 105, WB5ZED 111, K5MC 215 BPL.

MISSISSIPPI: SM, "Ernie" W5OXA—ASM: KJ5RC. STM: KB5W. OOC: W5VY. BM: W5EPW. PIC: AA5SP. SGL: KB5ZKK. TC: N4KMH ACC: K5VXV. Home Page is <http://users.aol.com/w5oxa/hpage.htm>. Section Mgr: 1998 Jackson Hamfest/Convention was another huge success due to the time and effort that was put in it. The Delta division director and vice director was there along with the representative from the League HQ. The directors informed us of the state of Amateur Radio and the League. They also reported on RF safety. It was a big success and thank all of

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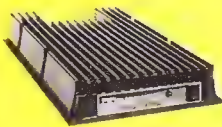
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you for making it that way. Nets for Feb 1998. DRN5 (7280 kHz): 62 sess; 650 QTC: MS rep 98% by KD5P, W5OXA, N5XGI and NSSM. JC Emrg Net (145.11): 31 sess; 433 QNI; 37 QTC; 204 EP. Magnolia Net (36825 kHz): 31 sess; 1029 QNI; 7 QTC. MS Baptist Net: 4 sess; 26 QNI; 0 QTC. MS Slow Net (3688 kHz): 22 sess; 135 QNI; 4 QTC. MS Tfc Net (3665 kHz) 30 sess; 66 QNI, 183 QTC. MS/LA Emrg Net: 4 Sess; 98 QNI; QTC: Emrg sess. PBRA Net (North): 31 sess; 743 QNI; 171 EP.

TENNESSEE: SM, O.D. Keaton, WA4GLS—ACC: WA4GLS. ASM: WB4DYJ. PIC: W4TYU. SEC: WD4EKA. STM: WA4HKU. OOC: AD4LO. TC: KB4LJV. For hams around Oak Ridge, a new 2-meter net is starting up on the 146.88 machine on Tuesdays at 8:00 PM and don't forget the RACES net on Monday at 7:00 PM on the 146.88 machine. ORARCs 1998 officers are: KC4RHW-pres, N4PWO-vp, WA4SYJ-sec, K4MOI-treas, WA4ADG-tech dir, KE4BDT-membership dir, W0BUH-pub dir. MARC, Columbia area, don't forget Mon 2-meter SSB ragchew on 144.210 at 7:00, the 10-meter net on T at 6:30 on 28.325, the 2 meter M-F at 8:30 PM on 147.12, the YL net on M at 8:00 PM on 146.91. The Mini Maury Swap/Needful Things Net on 147.12 on T after the regular net. NARC will miss David Scott, KK4WZ, who is moving to GA soon, David's support to the club will be surely missed. RACK says thanks for a job well done to Ed, KD4NDA, who resigned his activities chair. RACK members have done a great job assisting civic organizations in their activities during Ed's tenure. Members of BMRC/KARC, KC4SVN, KF4ENS, KE4SYP, KE4MNV, K4VUN, KE4DNV & AC4QZ helped in the Kingsport Parade and Santa trip during the Christmas Holidays. K4HYQ organized the group. CARC awarded Tom Cash, K4ZQX, the "Big Jon Anthony" Jon Ferrara Award for his outstanding contribution to local Amateur Radio. BSFARC elects 1998 officers: WA4WMN, pres; W4NPL, vp; AD4WB; sec/treas KE4QZQ, asst sec/treas, N4XNR, program dir. These officers did such a good job last year that they all were re-elected. WTARS's 1998 officers are: AB4EG, pres, N4WAL, VP. KB4DFC, treas. KF4JYP, sec. KD4RIP, equip mgr. SRARC YL page received the "Best CyberHam Award," for its recognition of YLs in the Amateur Radio service. SRARC 1998 officers are: W24L, pres, KF4GNV, vp, KF4GKN, sec; KE4DFC, treas. DRN-5 rpt. Sess 62, msg 650, TN rep 92% by K4WWQ, WB4GIJ, W4MML & W4OGG. Net sess/QTC/QNI: TPNP 31/47/2453; TCWN 31/25/237; TEMN 22/26/665; TEPN 26/69/2943; TSCWN 26/7/10. Tfc: N24O 387, N4LA 59, N4PU 51, W4OGG 44, WA4HKU 36, KA5KDB 34, WB4DYJ 18, WA4GZZ 14, W4SQE 14, WA4GLS 14, W4HZD 12, K14V 8, W4IKK 4, W4PSN 4.

GREAT LAKES DIVISION

KENTUCKY: SM, Bill Uschan, KC4MIS—ASM: Tom Lykins, K4LID. SEC: Craig Still, KD4PWK. ACC: John Embryo, K4AT. PIC: Steve McAllen, W2ZBY. STM: John Farmer, K4AVX. SGL: Ron Landrum, KM4DX. TC: Scotty Thompson, K14AT. BM, Ernie Pridemore, KC4IVG. Winter wasn't over yet like everyone thought. A major snow storm hit on February 4, 1998 and deposited as much as a foot of snow in Central Kentucky. The State EOC requested that ARES and NTS personnel be brought up to a higher state of readiness. Anyone listening to the Morning Ky Phone Net or the Ky. Phone Net in the evenings should have noticed a slight change in format. This a result of some of the fine work that the Net Managers do for NTS. Frankfort has a new two meter repeater up and running. The 145.390 was turned off and Jerry Shouse, N4EQT, assembled parts and pieces to put the new repeater on the air. The new frequency is 147.105, tuned to 107.2. It is a high profile repeater. The 145.390 frequency will be moved to Lawrenceburg. Severe Storm season should be started by the time this is published. Remember, if you are a weather spotter, make sure that you and your family are protected first. If you have to take shelter don't be ashamed to. There are those Ham operators that will spread nasty rumors, but do not let it bother you...

Net	QNI	QTC	Sess	Mgr
KRN	743	21	21	N4AFP
MKPN	1327	31	30	K4LID
KTN	1293	63	30	K4LID
KEN	204	440		KD4PWK
CARN	347	30	30	KB8WRU
4ARES	551	34	31	WA4RRR

Tfc: KD4PWK 47, KF4BDY 12, N4GD 14, N4LQ 5. K4AVX 53, KO4OL 7.

MICHIGAN: SM, Dick Mondro, WA4FQT (wa4fqt@arrl.org)—ASM: Roger Edwards, WB8WJV (wb8wvjv@centuryinter.net). ASM: John LaRock, K8XD (k8xd@voyager.net). SEC: Deborah Kirkbride, KA8YKK (ka8ykk@cris.com). STM: Dale Cryderman, KA9EIZ (dcryder222@juno.com). ACC: Mike Pearsall, N8MP (n8mp@zihills.net). OOC: Mark Drolias, N8IQX (mdrolias@gatecom.com). PIC: James (Eriv) Bates, KB8TNQ (kb8tnq@voyager.net). SGL: Ed Hude, WA8QE (edhude@juno.com). TC: Dave Smith, W8YZ (dsmith@smithassoc.com). VHF/UHF Net Manager: Paul Harmer, KB8ZDV. Section Newsletter Editor: Dave Colangelo, KB8RJL (dcolangelo@ameritech.net). Congratulations to the Firebird Amateur Radio Club's new officers. They are Pres. Dennis L. Simmons, N8XLS, VP. Myron L. Orman, Secy. Lawrence A. Hornsby, KB8POD, Treas. Verle D. Winghamam and Officer at Large Jack E. Walters, WA8UXN. If I'm not on the mailing list for your club newsletter, please see to it that I get one. Address on page 12 QST. How many of you are regular readers of this news column? Do you have any suggestions or comments on things you would like to see? Please let me know and if you read this column and enjoy it, I'd like to hear from you at the e-mail address above. Have you tried checking in to the Michigan ARPSC Net, Sunday afternoon at 5 PM on 3932? I am also looking for some net control stations. It's a lot of fun and really informative and a great way to spend a Sunday afternoon. I hope we hear you soon. June will be here before you know it and that means the "BIG" event. If your club has not begun planning for their Field Day activities yet, now is the time to start. You need committee chairmen to help in the planning and you also need lots of helpers. A great opportunity to get some of those newly licensed guys and gals to get involved and partake in some of the fun. I would love to kick back and do some operating with my XYL

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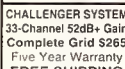
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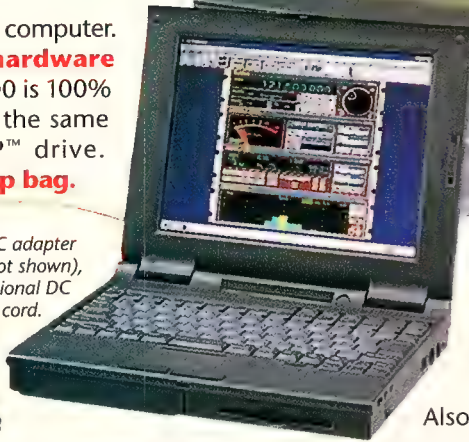
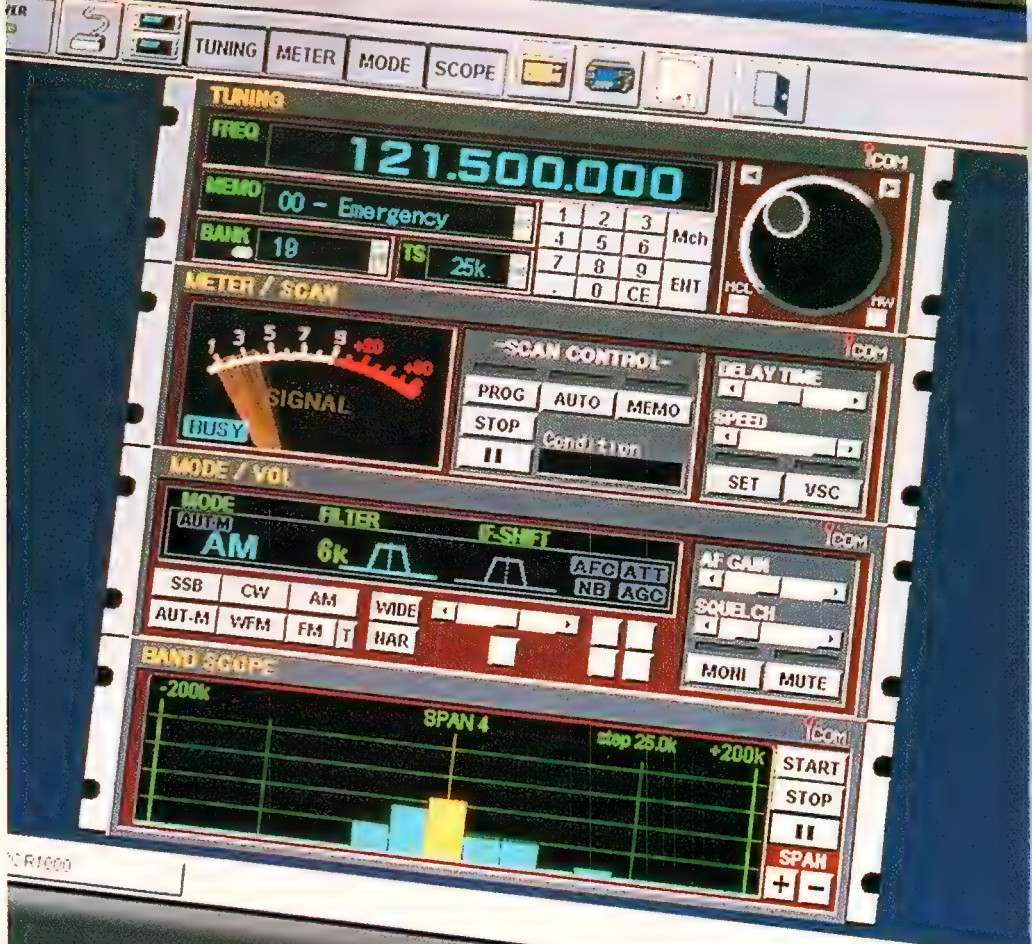
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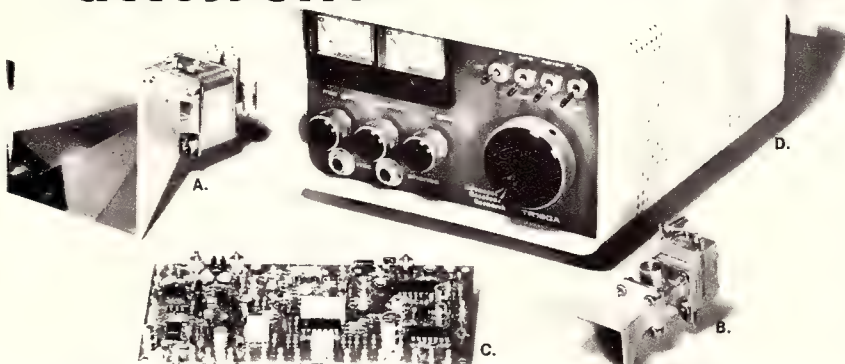
Also enjoy: unlimited memory channels, real time band scope, tone squelch (CTCSS) decode, 5 DTMF memories for advanced remote computer control, a 9600 baud data connection point for third party applications (like weather fax), and **optional DSP.**



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A. M/A-COM 10 GHz Gunnplexer. Two of these transceivers can form the heart of a 10 GHz communication system for voice, mcw, video or data transmission, not to mention mountaintop DXing! MA87127-1 (10 mW transceiver) and MA86551 (horn antenna) \$185.60. Higher power units (up to 100 mW) available. B. M/A-COM 24 GHz Gunnplexer. Similar characteristics to 10 GHz unit. MA87820 (20 mW transceiver) \$369.60. C. This support module is designed for use with the MA87127 and MA87820 and provides all of the circuitry for an audio transceive system. The board contains a low-noise, 30-MHz fm receiver, modulators for voice and mcw operation, Gunn diode regulator and varactor supply. Meter outputs are provided for monitoring received signal levels, discriminator output and varactor tuning voltage. RXMR30VDA assembled and tested \$139.95. D. Complete, ready to use communication system for voice or mcw operation. Ideal for repeater linking. A power supply capable of delivering 13 volts dc at 250 mA (for a 10 mW version), microphone, and headphone and/or loudspeaker are the only additional items needed for operation. The Gunnplexer can be removed for remote mounting to a tower or 2 or 4 foot parabolic antenna. TR10GA (10 GHz, 10 mW) \$499.95. Higher power units available. TR24GA (24 GHz, 20 mW) \$699.95. Also available: horn, 2 and 4 foot parabolic antennas, Gunn, varactor and defector diodes, search and lock systems, oscillator modules, waveguide, flanges, etc. Call or write for additional information. Let ARR take you higher with quality 10 and 24 GHz equipment!

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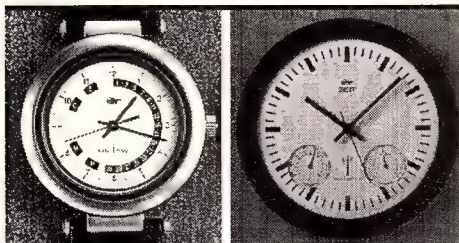
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this year. Any invitations? Several years back, I saw a cover article in QST about some sort of liquid dye that you inject into the coax going up to your beam that emits a colorful rainbow when you turn on the RF. Anyone remember where to get the stuff? Here's hoping you all have a happy April 1st! Great Lakes Division Webpage: <http://www.geocities.com/SiliconValley/Lab/4245> 73, Dick WA4FQT. Please support the following NTS Nets. January 1998 NTS Net Reports:

Net	ONI	QTC	Sess	NM	Freq	Time	Day
GMN no report				WB8SIW	3.663	6:308.10 PM	Daily
MACS	422	99	31	WB8RNO	3.953	11 AM	Daily (1 PM Sun.)
MITN	551	136	31	KA9EIZ	3.952	7 PM	Daily
UPN	1710	54	35	WA8DHB	3.921	5 PM	Daily (Noon Sun.)
GLETN	722	72	31	VE3SCY	3.932	9 PM	Daily
SEMTN	377	74	31	W8K	145.330	10:15 PM	Daily
WSSBN	1717	36	31	K8JRE	3.935	7 PM	Daily
ARAHH	54	1	4	KC8DAJ	145.130	8 PM	Wed
NCN	153	20	22	WD7G	146.940	7:30 PM	M-F
VHF	501	59	57	KB8ZDV	Vanous		

Tfc (Dec): KA9EIZ 174, WB8SIW 155, WX8Y 120, KB8HGM 116, N8FPN 98, K8GXV 84, N8TDE 79, KB8ZY 72, AA8PI 71, KC8GMT 52, W8RNO 52, K8LJG 51, WA8DHB 47, K3UWO 39, W8RF 39, WA8JXG 38, KBUE 26, K8AI 20, K8ZJU 15, K8KIR 15, WB8YI 14, KC8GRP 14, AA8SN 10, N8OSC 4, K8LAR 3, W8YZ 3.

OHIO: SM, David Kersten, N8AUH @W8IZ (see p 12) or dave.kersten@irmg.com—ASM: John Haungs, WA8STX 513-782-6464. ASM Packet: Steve Wolf, W8IZ @W8IZ. SEC: Larry Solak, WD8MPV 330-274-8240. STM: Jack Wagoner, WB8FSV, fsv@netwalk.com. ACC: Joanne Solak, KJ3O/8; 330-274-8240. BM: John Schlueter, W8WYH @W8BI. TC: John Fakan, KB8MU. SGL: Paul Krugh, N2NS @W8CQK. PIC: Beverly Priest, N8VZV, mapriest@erinet.com. OOC: Paul LaFollette, Jr. wb8ona@worldnet.att.net. Two more clubs have announced new club officers: Sandusky Valley ARC: Pres-KC8AYK, VP-KF4ACP, Secty-Treas-KB8GSA; and Warren Area, Pres-K8OUA, VP-KB8SVF, Secty-WA8TJL, Treas-N8IKX. Good luck with your responsibilities in the upcoming year. Please don't hesitate to call on Joanne, KJ3O/8 if you need any help with club ARRL liaison. I'm also pleased to announce the renewal of Twenty Over Nine Radio Club's Special Service Club Status - Thanks, folks, for your great service to Amateur Radio! As mentioned in the last Section News column, a small committee was appointed at the last Section Conference to develop some guidelines for a Section Club Competition, to encourage and assist clubs to become more active through sharing successful ideas/projects by rewarding competitive recognition to those with the best projects and/or activities. A preliminary proposal has come forth and it is being evaluated. Again, my thanks to K8OUA, N8CX and N8YRF for developing this idea. More on this in a future Column, also to be appearing in the OHIO SECTION JOURNAL. You DO get the OSJ, don't you? Anyone with a Field Organization Appointment and all Affiliated/Special Service Clubs are automatic recipients. Another reminder that the rules for entering the Ohio Section Newsletter competition for 1998 have changed a bit: One key change is that YOU choose what you feel are your best issues. You, of course, must get your selected entries to Beverly, N8VZV. See our Ohio Section Journal for details. The Section Nets times and frequencies are listed below. Scheduled hamfests include - Athens Co. ARA, April 26; Twenty Over Nine ARC (Youngstown), April 26; Dayton ARA Hamvention, May 15-17. Bob Johnson, K3RC/8, maintains the listing of Amateur Radio exams throughout Ohio: This list is available on the packet network and in OHIO SECTION JOURNAL. Net and Station Activity reports for January 1998 follow

Net	ONI	QTC	QTR	Sess	Time	Freq	NM
BN(E)	190	121	339	31	1845	3.577	WB8KFN
BN (L)	185	69	330	31	2200	3.577	NY8V
BNR	135	17	969	29	1800	3.605	W7LDO
OSN	178	66	608	31	1810	3.708	WB8KJQ
OSBN	1880	625	2482	93	1030	3.9725	KF8DO

1615,1845 3.972

Tic: N8IXF 509, W8PBX 295, W8PMJ 218, K8DHB 181, WB8KFN 148, KF8DO 141, WA8HED 134, K8DHD 125, W8RG 106, K8OUA 90, KA8HBN 86, WA8S136, WB8FSV 85, WB8ZJN 82, N58C 79, N8AUH 79, N8FWA 76, WA8EYO 71, N2NS 56, KB8TIA 54, KBWQO 50, WD8KWB 48, N8YXL 45, N8TNY 45, K18O 42, KB8VYB 41, K8FWDU 37, NY8V 34, N8DD 31, KB8ROA 31, KBVES 30, WB8KWO 30, N8RRB 30, W8JLW 28, KD9K 28, KC4IYD 27, W8EYJ 27, N8GOB 27, KC8DWM 27, KB9GGA 27, W8BO 24, W8LDQ 20, N8CX 19, N8PAI 18, WB8FWF 16, WB8HHZ 16, KF8FE 14, K8QIP 11, K8WC 10, W8GAC 8, KC8HTP 8, KB8SBK 7, K8DXL 7, N8LSG 6, AA8XS 6, KA8GOV 5, KB8SIA 5, N8EFB 5, KC8IDM 4, WD8MIO 3, KB8RHG 3. (Nov) KC8HTP 17.

HUDSON DIVISION

EASTERN NEW YORK: SM, Rob Leiden, KR2L (@WA2UMX)—STM: Rick Warren, KF2YC. SEC: Tony Pazzola, WB2BEJ. ACC: Shirley Dahlgren, N2SKP. SGL: Phil Bradley, KB2HQ. PIC and BM: Steve Anderman, WA3RKB. OOC: Hal Post, AK2E. TC: Elmer Sharp, WA2SM. ASM: Tom Raffaeli, WB2NHG. ASM: Bob Chamberlain, N2KBC. ASM: Andrew Schmidt, N2FTR. ASM: Richard Sandell WK6R. Net Reports (January 1998) Check-ins (QNI)/Traffic handled (QTC+QSP): AESN: 45/6 CDN: 454/120 ESS 386/244 HVN: 500/232 NYP: 337/874 NYPON: 353/523 NYS/E: 380/451 NYS/L: 215/286 NYS/M: 256/317 SDN: 428/120. Section News: WARA has been demonstrating some great new equipment at their meetings at the White Plains Red Cross Chapter House...check it out the 1st Wed of the month! Many ENY ops helped NNY during the recent ice storm as well as providing net control service at State Emergency Management HQ. On behalf of NNY SM Les, WA2AEA, and myself, many thanks for your public service achievement. Amateur Radio got through when all else failed and 75M HF proved to be the key. I'm looking forward to seeing friends at WECA in March and PARC in April. April 26 is also Beaconfest so mark your calendar. Heard about the new ARRL Radio Coaches Program? If you'd like your club to partner with a local school or community organization to help students learn about Amateur Radio and career oppor-

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MODEL	BAND	GAIN (dBd.)	WATTS	CONN.	HT. IN.	ELEMENT PHASING
NR72BNMO ⁶	2m/70cm		100	NMO	13.8	1/4λ, 1/2λ
NR73BNMO	2m/70cm		100	NMO	33.5	1/2λ, 1-5/8λ
NR770SA ⁶	2m/70cm		100	UHF	16.9	1/4λ, 1/2λ
NR770HA ⁷	2m/70cm		200	UHF	40.2	1/2λ, 2-5/8λ
NR770HNM ⁸	2m/70cm		200	NMO	38.2	1/2λ, 2-5/8λ
NR770RA	2m/70cm		200	UHF	38.6	1/2λ, 2-5/8λ
NR790A*	2m/70cm		120	UHF	57.5	6/8λ, 3-5/8λ
SG7000 ⁶	2m/70cm		100	UHF	18.5	1/4λ, 6/8λ
SG7200NMO	2m/70cm		150	NMO	36.6	1/2λ, 2-5/8λ
SG7500A	2m/70cm		150	UHF	40.6	1/2λ, 2-5/8λ
SG7500NMO	2m/70cm		150	NMO	41.0	1/2λ, 2-5/8λ

1/4λ antennas rated in dBi.

MODEL	BAND	GAIN (dBd.)	WATTS	CONN.	HT. IN.	ELEMENT PHASING
SG7900*	2m/70cm		150	UHF	62.2	7/8λ, 3-5/8λ
SG2000*	2m		150	UHF	62.6	7/8λ
SG6000NMO ^{6,9}	6m		150	NMO	39	1/4λ
NR140A	1-1/4m		100	UHF	36.2	5/8λ
NR124	23cm		100	N	25	4-5/8λ
CR214S ⁶	2m/1-1/4m		120	UHF	37	1/2λ, 5/8λ
CR224A* ⁶	2m/1-1/4m		150	UHF	68.5	7/8λ, 2-5/8λ
CR320A ⁶	2m/1-1/4m/70cm		200/200/100	UHF	37.4	1/4λ, 1/2λ, 2-5/8λ
CR627B ^{6,9} CR627BNMO ^{6,9}	6m/2m/70cm		120/200/100	UHF NMO	60	1/4λ, 1/2+1/4λ/2-5/8λ
NR2000NA	2m/70cm/23cm		100	N	39	1/2λ, 2-5/8λ, 5-5/8λ

* Not recommended for Magnet Mount

⁶ Grounding required.

⁷ NR770HB same specifications but in black finish.

⁸ NR770HBNMO same specifications but in black finish.

⁹ 50MHz antennas adjustable

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MODEL NO.	HEIGHT MAX.	HEIGHT MIN.	NUMBER SECTIONS	WEIGHT POUNDS	SEC. OD Top.	SEC. OD Bot.	SUGGESTED HAM PRICE
MA-40	40'	21'6"	2	242	3"sq.	4 1/2"	\$899
MA-550	55'	22'1"	3	435	3"sq.	6"	\$1521
MA-550MDP*	55'	22'1"	3	620	3"sq.	6"	\$3258
MA-770	71'	22'10"	4	645	3"sq.	8"	\$2810
MA-770MDP*	71'	22'10"	4	830	3"sq.	8"	\$4445
MA-850MDP*	85'	23'6"	5	1128	3"sq.	10"	\$5991

Standard bases and eye mounts included with all towers (except MA-770, 770-MDP and 850-MDP)

*MDP models complete with heavy-duty motor drive with positive pull down.

Shown
w/optional
rotor base
and rotor.

FREE STANDING CRANK-UP TOWERS

Will handle 18 sq. ft. antennas at 50 MPH winds.

MODEL NO.	HEIGHT MAX.	HEIGHT MIN.	NUMBER SECTIONS	WEIGHT POUNDS	SEC. OD Top.	SEC. OD Bot.	SUGGESTED HAM PRICE
TX-438	38'	21'6"	2	355	12 1/2"	15"	\$1269
TX-455	55'	22'	3	670	12 1/2"	18"	\$1710
TX-472	72'	22'8"	4	1040	12 1/2"	21 5/8"	\$3147
TX-472MDP*	72'	22'8"	4	1210	12 1/2"	21 5/8"	\$5084
TX-489	89'	23'4"	5	1590	12 1/2"	25 5/8"	\$5475
TX-489MDPL*	89'	23'4"	5	1800	12 1/2"	25 5/8"	\$8212

* TX-472MDP includes heavy duty motor drive with positive pull down.

TX-489MDPL comes with heavy duty motor drive with dual level wind and positive pull down.

MDPL models include fully operational limit switch packages.

FREE STANDING HEAVY-DUTY CRANK-UP TOWERS

Will handle 30 sq. ft. antennas at 50 MPH winds.

MODEL NO.	HEIGHT MAX.	HEIGHT MIN.	NUMBER SECTIONS	WEIGHT POUNDS	SEC. OD Top.	SEC. OD Bot.	SUGGESTED HAM PRICE
HDX-538	38'	21'6"	2	600	15"	18"	\$1642
HDX-555	55'	22'	3	870	15"	21 5/8"	\$2874
HDX-572	72'	22'8"	4	1420	15"	25 5/8"	\$4927
HDX-572MDPL*	72'	22'8"	4	1600	15"	25 5/8"	\$7528
HDX-589MDPL*	89'	23'8"	5	2440	15"	30 5/8"	\$9855
HDX-689MDPL*	89'	23'8"	5	3450	18"	37 1/8"	\$19,039
HDX-5106MDPL*	106'	24'8"	6	3700	15"	37 1/8"	\$20,719

* Includes heavy-duty motor drives with dual level wind and positive pull down. MDPL models include fully operational limit switch packages.

*HDX-689MDPL rated at 60 sq. ft. of antenna at 50 mph winds. *HDX-5106MDPL rated at 35 sq. ft. of antenna at 50 mph winds.

FREE STANDING "LOW PROFILE" COMPACT CRANK-UP TOWERS

Will handle 18 sq. ft. antennas at 50 MPH winds. (TMM-433HD handles 24 sq. ft.)

MODEL NO.	HEIGHT MAX.	HEIGHT MIN.	NUMBER SECTIONS	WEIGHT POUNDS	SEC. OD Top.	SEC. OD Bot.	SUGGESTED HAM PRICE
TMM-433SS*	33'	11'4"	4	315	10"	18"	\$1355
TMM-433HD*	33'	11'4"	4	400	12 1/2"	20 7/8"	\$1642
TMM-541SS*	41'	12'	5	430	10"	20 7/8"	\$1779

* Rotators must be top mounted

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The new **ARRL Net Directory** is available. This latest **1997-98 Edition** lists hundreds of Amateur Radio nets of interest to North American hams—DX, ragchew, special-interest, fun and public service nets—they're all here! Includes world-wide coverage nets and maritime service nets, and information for the new or well-seasoned traffic handler.

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tunities in telecommunications, contact me or Rick Palm at ARRL HQ and we'll get you started. PSHR: N2YJZ 279, N2JBA 158, WB2ZCM 142, KC2AGL 95, KB2VXF 73, TC: N2YJZ 585, N2JBA 48, WB2ZCM 39, KC2AGL 31, W2CJO 25, KC2CRO 20, KB2VXF 6.

NEW YORK CITY/LONG ISLAND: SM, Len Buonaio, KE2LE—ASM: KB2SCS. ASM: KD2YA. ACC: K2EJ. STM: WA2YOW. ASM: W2IK. PIC: N2RBU. TC: WY2U. BM: KC2FD. SGL: W2UFO. LGL: KA2RGI/Babylon. LGL: WA2KXE/Long Beach, WB2MGP/Staten Island. LGL: KB2TWO Queens. LGL: N2HH/Oyster Bay. OOC: N2JIX. Hope all my supporters have made the right choice as the future of NLI depends on it. If all continues we will see mega changes very soon. More has been done at this desk in 15 months than has been done in the past four years. No grandstanding, appearances or photo sessions can imagine our efforts and positive change. The good of the many were always first in our mind. Thanks for your help in this very trying time, but it is worth it. NYC/LI VE exam list as follows: VE sessions: Islip ARES, 1st Sat 9 AM, Islip Town Hall West, 401 Main St. Islip, Addison Levi, KD2YA, 516-234-0589. Bears VE: ABC Bldg Cafeteria, 125 West End Ave at 66th St. Call Hotline 212-456-5224 for exact dates & times. Jerry Cudmore, K2JRC. Grumman ARC (W5YI) 2nd Tues 5 PM, Northrop-Grumman Plant 5 S Oyster Bay Rd via Hazel St, Bethpage, NY, Bob Wexelbaum, W2ILP, 516-499-2214. LIMARC, 2nd Sat 9 AM NY Inst of Tech, 400 Bldg Rm 409, Northern Blvd, Old Westbury, Al Bender, W2QZ, 516-623-6449. GALLUPS Island Rd 3rd Sat 1 PM, USMMA, Bowditch Hall, Steamboat Rd, Kings Point, NY, Les Rauber, AA2E, 516-922-0947. Great South Bay ARC 4th Sun 12 PM Babylon Town Hall, ARES/RACES Rm 200 E Sunrise Hwy N Lindenhurst, Tom Carrubba, KA2DFO, 516-422-9684 Hellenic ARA: 4th Tues 6:30 PM, Pantion Society, 31-25 23rd Ave, Astoria, NY, George Anastasiadis, KF2PG, 516-937-0775. Larkfield ARC: 3rd Sat 9 AM, Huntington Town Hall, 100 Main St, Huntington, NY, Joe Coffield, W2DDZ, 516-266-3192. Columbia U VE Team: 3rd Mon 6:30 PM, Watson Lab 6th floor, 612 W 115th St, NY, Alan Crosswell, N2YJK, 212-854-3754 PSHR: exams held every three months at Southold School Oaklawn Ave, Southold, NY, on next to last Friday of the month 6:30 PM all classes of licenses. For info contact Ralph Williams, N3BT, 516-323-3646. Tlc: N2AKZ 309, WB2GTG 226, KA2VZX 108, W2RJL 100, N2WGF 89, KB2KLH 82, N2XOJ 76, KC2ACL 64, KB2GEK 44, WA2YOW 42, KB2ZHF 36, AA2NX 18, NB2D 10, N2OQI 10, N2ZM2 10, WA2VZK 6.

NORTHERN NEW JERSEY: SM, Roy H. Edwards, Sr, AB2RE, AB2RE@AB2RE-4, e-mail: AB2RE@arrl.org—ASM: KB2CMF. ASM: OOC KB2JSG. ASM: N2WZB NNJ Webmaster. Volunteer Counsel/N2IOB, BM: N2LXM. SEC: K2SEC. STM: WB2FTX. PIC: WX2DEB. A Northern New Jersey Section Public Information Officers Meeting and Workshop was held at the Summit Speech School on February 7th thanks to and hosted by, Deb McKay, WX2DEB, and John Carno, KC2AHE, Division Director Frank Fallon, N2FF, attended and shared many interesting facts and statistics concerning our hobby and its membership. Director Fallon also gave some good suggestions as to dealing with local news media. Former NNJ SM and CQ VHF Editor, Rich Moseson, W2VU was also a guest speaker and enlightened those in attendance as to the activity of the ARRL Public Relations committee of which he is a member. The furthest distance traveled award when to the Hudson Loop editor Stephan Anderman, K2SMA. Stephan told the who, where, why what's and whens of the Hudson Loop which has become extremely successful, appreciated and helpful in a very short time. I hope to see the attendance of such workshops grow in the future just as the subscriptions to the Loop have. I would like to personally thank all who took part in the workshop and its production. It is with mixed emotions that I would like to inform Pinellas County, FL that a wonderful family, including an intelligent hardworking, generous all around Radio Amateur are soon to become residents. NNJ Section Emergency Coordinator and Hudson Division Assistant Director Paul Toth and family are moving from the area. I am certain that I speak for all that have ever met Paul and his family that we will keep them in our hearts and thoughts. Hey Paul, don't become rare DX, keep in touch! Well, has cabin fever set in yet? Don't worry, Spring and the 1998 North Jersey Hamfest are just around the corner. I hope to see and speak with many of the readers of this column March 7th. at the PAL Building in Parsippany and at the Irvington Roseland Hamfest held in the West Orange High School on February 21st. Why not invite some of your friends to attend, they're all potential future hams. Might as well help them start their wish list off to a great beginning. Our Section Official Observer Coordinator Marty Goldfarb's has once again asked that his e-mail address, MSGJSG@juno.com, be listed here in the section's column so that anyone interested in becoming part of the Field Services or with a need concerning the Amateur Aux. please feel free to get in touch with him. Jan 1998 Northern NJ STM report: SAR/PSHR: N2XJ 151/139, W2MTO 115/115, N2OPJ 75/166, N2GJ 45/173, K2VX 35/92, W2PTZ 21/96, WA2SEI 20/113, N2QAE 20/31, N2RPI 19/151, KB2OPJ 16/110, N2TTT 14/37, W2CC 12/88, KB2VVB 11/158, WB2CZW 10/102.

MIDWEST DIVISION

IOWA: SM, Jim Lasley, N0JL @ KE0BX—ASM: N0LDD. SEC: N0AR. ACC: N0JUP @ KE0BX. BM: K0IIR @ W0CXX. SGL: K0KD. TC: W0DIA. Some guys don't want to give the program. NIRAA had one break his leg, just to get out of doing the program! Hope you are much better by now. Gary, DMRAA had a bunch, and I mean a bunch, of people helping with Operation Santa Claus. I count 86 in the list. That took fingers and toes on almost the whole family to count that high! SEITS has a big article on "Duplex Theory and Tuning" this month by WA0AUQ. I haven't had time to read it yet, but I will, Dave. Note that KD7RV is a Silent Key from Iowa City. I note that a couple of clubs are sending me two newsletters (DMRAA and DARC). Several groups remind me that it is time for storm spotter training again. I need to get to one this time. N0AAA did an interesting article for CVARC on the vanity call system. OARC lists some interesting programs for the Saturday morning breakfasts (the importance of disaster prep on the Iowa economy). Thanks Steve, both of you! A new club is reporting this month. It is the Tri-State ARC (TSARC) centered at Cresco. They have a repeater and a great looking emergency van. I regret that this report may

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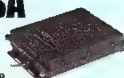
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be short and incomplete. Please forgive me if I have missed or lost YOUR report. I have changed jobs in mid January and I write in early February and I'm still too busy to get much done but work and sleep. I'm working with computers and too many operating systems to get into my old head quickly (96, NT 3.51, NT 4.0, UNIX, and MPE). I hope to fill things in next month. 73 and keep on doing' good!

KANSAS: SM Oran Q. Cook, W00YH—ASM/ACC/OCC: Robert Summers, K0BKF. SEC Joseph Plankinton WD0DMV, SGL Marshall Reese, AA0GL. Hi gang, the Kansas Sideband Net has moved back to 5:30 PM local time now that the band is not stretched out so bad. Congrats to Elden N0KJ, he BPLed 500 pts this month. If you write a newsletter, I would appreciate a copy to keep me up with what is happening in your area. BBS ops, please let me know your number of ARRL bulletins, personal and NTS traffic handled by your BBS. I need your your e-mail address and hams you know. Please send them to orlan@swbell.net. If you hold a "Technician license" and would like to deliver HF messages to your neighbors that General class or higher normally do, send me your e-mail address. I have a number of ARRL Ks appointment openings such as Official Observer, Official Relay Station, Official Bulletin Station and etc. Contact me if interested Reports for Dec. Nets: sessions/QNI/OTC, KSNB 31/91/778, KPN 22/250/26, KMWV 31/649/488, KWN 31/844/566, CSTN 27/2039/104, QKS 59/310/145, QKS-SS 4/8/1, LAN: Parson ARC 3/43/0, Coffeyville ARC 5/83/0, Ind ARC 4/48/0 via N0LIE. SEC report QTC/3 with AA0IQ AC0E WD0DDG WD0DMV. TEN report 276 mssgs 62 sessions Ks stns 89% with KB0DTI AC0E, AA0FO, KX0I, K0PY, N0BZ, W0BZEN, W0BZEN, W0BZNY = Dave TEN mgr. Packet BBS reports W1AW Bulletins/Personal/NTS, AA0HJ 48/542/2, N0JJV 19/276/1, N0OBM 41/361/2, NX0R 29/412/9. Tlc: N0KJ 500, AA0OM 252 W0BZNY 176 W00YH 103, K0PY 74 KX0I 72 K0RY 27 W0FT 17 N0BZ 17 KB0DTI 15 N0L2.

MISSOURI: SM, Roger Volk, K0GOB—ACC: Keith, WE0G. ASM: Karen, N0TDW. ASM: Tom, K10JO. BM: Charlie, W0DLG. OOC: Mike, N0QBF. PIC: Dennis, AA0A. SGL: Ern, K0QUD. SEC: Fred, WA0US. STM: Tom, K10JO. Tlc: Mac, K4CHS. It pains me to report that Larry Reeves, WA0GKZ, became a SK on 2/1/98. Larry was president of the QCWA 35 chapter and one of the prime movers of the national convention in KC this past Oct. He was only 51. To reduce their costs, many clubs now send me their newsletters via e-mail. That's good for me also. I can get their newsletters in a timely manner and begin putting this column together while on the road. You can send the info directly to me at k0gob@juno.com or through the League at k0gob@arri.org. Hamfests on both sides of the state were successful this month. Hams and vendors supported the St Joe and St Charles hamfests in record numbers. Some hams even spent money. Hi Hi. Three manufacturers attended the St Charles event attesting to its growing importance in the section. With winter wv virtually non-existent, the SCARC has begun their Sunday afternoon Fox Hunts early this year. These weekly hunts are lots of fun and they help develop valuable skills. Like eating lots of pizza when the hunt is over. New officers for the HARC are pres Dinnis, N0UYN; vp Beryl, W0BDD; sec Mike, K0UAA and treas Bruce, N0YLF. Officers for the SMARC are pres Mike, N0NQW, vp Karen, N0TDW, sec Fred, K10ET and treas Jude, KF0YZ. Local, area and state-wide hamfests are not in full swing. Support the clubs that sponsor them and stop by the ARRL booth to say hello. Nets: MOTRAN 31/754/152 K0IPM; STLRPT 4/1346 K0WEX; PAULREVERE 4/540/0 N0IWA; HAMBUTCHERS 22/1018/271 WL7YM; MONI & 2 62/226/90 W0OTF; ROLLABB 31/347/21 NA0V; KCABARC 4/182/5 KA0SSE; WAARCI 4/93/0 KB9DQB; WJACKCOARES 4/47/0 K0UAA; 1880GOB 31/217/32 WL7YM; SWMOWARN 5/120/2 N0UAM; CARL 4/41/0 K0QMV; AUDRAINARC 5/52/1 W0BSEN; HARC 5/282/5 N0YLF; QCWA35 5/106/0 K0YML. Tlc: K10JO 566, KE0K, W0OTF 76.

NEBRASKA: SM, Bill McCollum, KE0XQ—ASMs: W0KVM, N0MT, W0BULH, WY0F & W0YWO. I am pleased to announce that Mary Joseph, N0TRK, is the 1997 "Nebraska Ham of the Year". Mary is a past president of the AK-SARBEN ARC, and is active in ARES and public service. She recently started an "Elmer" Net for new hams. I want to thank all that submitted nominations. A big thank you goes to K4VX and K0BJ for making the selection. KB0DY has resigned as Saunders County EC. I want to thank Jim for his many years of service to the section. Replacing him is Matt, KA0BOJ of Ashland. KA0BOJ has also informed me that the Ashland ARC has reformed. 30 Section members attended an ARES meeting on Jan. 10th at the Midway ARC Hamfest in Kearney. The meeting was chaired by EC W0WHY. Working with disaster relief organizations and the NWS was discussed. Net Reports: NMPN, QNI 1456, QTC 6 & 31 sessions. WNE Net, QNI 2110, QTC 236 & 26 sessions. NCHN, QNI 518, QTC 34 & 31 sessions. Mid NE ARES, QNI 379, QTC 1 & 31 sessions. NE Storm Net, QNI 1014, QTC 15 & 31 sessions. W0IRZ Memorial Net QNI 28 & sessions. NE 40 Meter Net, QNI 30 & 3 sessions. Tlc: K0PTK 114, KE0XQ 18, WY0F 6, W0EXK 2, N0CQI 2, K0QAL 2, K0RRL 2, KA0DOC 2, WC0O 2, PSRR: KA0DBK 47, KB0YTM 14.

NEW ENGLAND DIVISION

CONNECTICUT: SM, Betsey Doane, K1EIC—ASMs: K21Z, KB1H, NK1J, K1STM, N1API. ACC: WA1CBW, SM: KD1YV. OOC: W1FAI. PIC: W1FXQ. SEC: N1IU. SGL: K1AH. STM: K1HEJ. TC: K1KJZ. The big news this month is that the Candlewood ARA and Middlesex ARS both got full exemptions for the installations of Amateur Radio towers written into Town ordinances. CARA worked with the Town of Bethel and MARS worked with Middletown officials. On behalf of all Amateur Radio operators in CT, I just want to thank all of you involved for your fine work. OUTSTANDING! Congrats to Vic, W1NLI, on 675 confirmed DX contacts through the Russian RS-12 Satellite—a world record! Two new presidents of CT clubs were elected: Frank, N1XCO, FARA; and Ralph, N1VIM, NARL. Congrats to you both! You have joined a group of very fine club presidents who are really working hard for Amateur Radio in CT. Wait, KA1DFH, reports that the Plainville ARC is working very closely with the American Red Cross learning their procedures and showing them a bit about NTS protocol. The Valley Area is starting up a quarterly VE session in Shelton—next one is April 21 at 6:00 PM at the Pine Rock Firehouse. They are a new enthused VE team so come on

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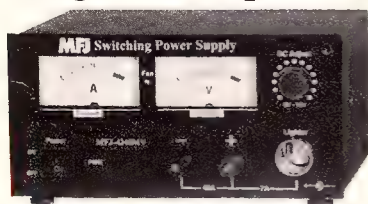
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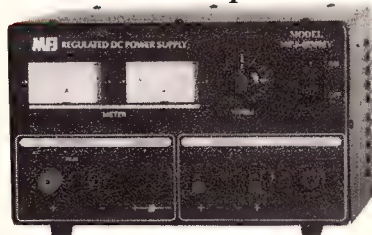
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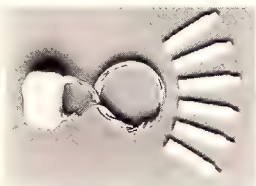
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out and take your next test! The Middlesex ARS regularly has training for communications relating to finding a child. I believe that it is a once-a-month Sunday activity so contact the club if interested. It is with deep sadness that I report the passing of Howard, W1OPS. I will always remember Howard as one of the pioneers in building the packet network in the eastern part of the state. One of my backbone nodes used to connect directly to W1OPS on 220, Caesar, N1DCS, our former SM, Howard and I used to work very nicely together on the packet network. He surely will be missed—a very FB op and a real gentleman! Thanks to the work of KD1LD, KA1PQB, KA6PDG and KA1BB for working at a shelter in Montville during one of the ice storms in Eastern CT. Check out the new url for the Shore Point ARC Web Site: <http://www.qsl.net/sparc>. Congrats to the Meriden ARC on being renewed as a Special Service Club. Net/sess/QNI/OTC: NVTN 31/23/82; WESCON 31/428/124; RTN 57/294/49; CPN 31/277/81; CN 26/87/28; BEARS of Manchester 31/281/425. Tlc: NM1K 2060, KA1VEC 531, KA1GWE 213, WA4QXT 196, K1STM 193, N1VXP 114, KE1AI 39, N1PNT 33, K1HEJ 33, N1YVV 26.

EASTERN MASSACHUSETTS: SM: Larry Ober, W1MW—ASMS: WA1IDA, KE1BG, N1GTB, N1UGA, N1SGL. ACC: Open. BM: N1ST. OOC: K1LJN. PIC: N1PBA. SEC: W3EVE. K3HI. STM: WA1TBY. TC: W3EVE. EMA ARRL: voice: 978 263-2498. Packet bulletins: ARRL@EMABBS. E-mail: w1mw@arrl.org. e-mail list: ema-arrrl@netcom.com. Web: <http://www.qsl.net/ema-arrrl>. The Algonquin ARC kicked off the Flea Market Season with their Valentine's Day event. It was well stocked and attended. Many fleas propagated to other QTHs. Quannapowitt ARA has been holding classes at the Northeast Regional Vocational High School. They have also added a web page at www.rioux.org/QRA. The Falmouth ARA has been active with the Cape Tower Committee in trying to get more ham favorable zoning throughout Cape Cod. Special thanks to Saul Dinman, K1PDX, and Lyman Mix, WA1KPE, among the many others helping with this important work. In the truth is stranger than fiction department a Barnstable ham was finally granted zoning permission for his tower after the Court ruled that the town was in violation of the Massachusetts version of PRB-1. The town then put on a horizontal projection limit of 10ft! We hope that common sense or the Courts have subsequently prevailed to allow the gentleman to work HF below 2m. The Cape Ann ARA was one of the last to snare Don Haney, KA1T, prior to his relocation to Wisconsin and resignation as New England Division Vice Director. The Nashoba Valley ARC is holding a meeting where members can compare the performance of various DSP units. Neat idea. The Genesis ARS is holding a series of fund raisers at Burger King. It's unclear whether this has anything to do with the number of Whoppers members can pack away. The Acton-Boxborough ARC viewed the Heard Island DXpedition tape at a recent meeting. They are starting to plan early for Field Day. Perhaps Heard Island will influence the operation. The Boston ARC is looking for a new home. Their sponsor for use of the Volpe Transportation Center will retire soon. They, along with many clubs in the Section, are looking for ways to trim newsletter costs. The Norwood ARC has scheduled their annual dinner for February. They will also be offering Novice/Tech classes through Norwood Adult Education. Section Traffic Manager Jim Hatherly, WA1TBY, will be speaking at the Framingham ARA. Steve Rosenthal, AA1IZ, and Martin Bayes, AA1ON, of FARA, would like to share their IOTA adventure on Gallops Island in Boston Harbor. It was the home to the Gallops Island Radio School, a military installation, during WWII. They have a video presentation that they are willing to give at interested clubs. Contact sr@ultranet.com. Tlc: WA1TBY 388, WB2EAG 338, K1UGM 252, WA1FNM 189, NZ1D 153, N1LKJ 136, W1EO 126, KA1WCD 80, N1LH 62, K1SEC 60, N1AJJ 56, KD1LE 56, KY1B 53, N1ST 45, N1SGL 44, WA1LPM 37, N1VUX 35, K8SH 35, K1BZD 34, N1TDF 29, KA1VAX 25, N1TPU 18, N1XLO 11, KD1NQ 10, N1LRT 9, KA1BBU 8, KB1EB 7, N1XQV 5.

MAINE: SM, Michelle Mann, W1GU—ASMS: WA1YNZ & KA1TKS. STM: NX1A. BM: W1JTH. TC: NS1Z. SGL: W1AO. ACC: KA1RFD. OOC: KA1WRC. PIC: KD1OW. Asst Dirs: W1KX, KA1TKS, K1NIT. Silent Keys: WA1ATX and W1APU, they'll be missed. The second annual Winterfest was a great success at the new Crystal Falls location in Chelsea. Nice to see everyone after the long winter months. The big news for January was the Ice Storm. We were out here for 8 days and lost our antennas. Many people went much longer. With no power and no phone, I couldn't even get out this column or reports for December. There was quite a bit of ham activity when it was requested, from what I've heard. A great job was done by a bunch of hams in Winthrop, helping the Red Cross at area shelters and with food deliveries for several days. AA1PN, Clarence, was surprised to find visiting VP Al Gore on the other end of a QSO on 146.85! KA1RFD was manning the ham station at the State House when Gore came through. We are still in need of a Section Emergency Coordinator. Let me know if you are interested. State RACES Director (and ACC) Rod, KA1RFD, is filling in as acting SEC. Queries and comments should go to him for now. Tlc: W1KX 151, NX1A 106, AF1L 80, W1CE 77, AA1KC 49, N1JBD 42, W1QU 41, WA1YNZ 41, NR1W 40, N1WL 25, K1UNQ 16, W1JX 13, KA2ZKM 11, KA1RFD 5—73 de Michelle.

NEW HAMPSHIRE: SM, Al Shuman, N1FIK—ASMS: WB1ASL, W1NH, N3CLZ, N1FIL, N1KIM TC: WA1HOG. SEC: WB1ASL. STM: WA1JVJ. ACC: NA1E. SGL: K1KM. BM: KH6GR. OOC: W1GTA. PIC: KA1GOZ. The New Hampshire web site has a new address and a new look. We are now at www.nh.arrl.org. Come visit us! The Amoskeag and NARC clubs report they are running code practice on local repeaters. This is a great way to beat winter doldrums and do something worthwhile to boot. WB1ASL reports that participation in this year's NH QSO Party was strong. The NHARA distributed over 50 copies of the newly designed software. Thanks to Steve, N1SG, for his software writing abilities. Look for QSO Party scores in the near future. Sad to report the passing of Bill Wood, N1RL in January and Carl Evans, W1BFT, of Evans Radio fame of Concord, NH. The North Country ARC and LARK will hold their annual Flea Market on April 4th. Contact Rich, WB1ASL, for further info. This is the first time this Flea has been ARRL sanctioned. Come up and visit and feel free to fire off a couple of barbs my way. Spring is nearly here. This will give me a chance to repair my beam that I lost in the ice storm of

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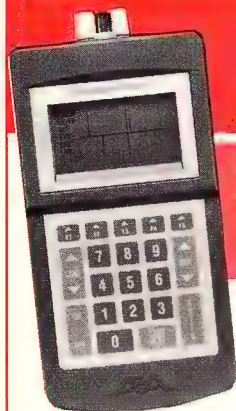
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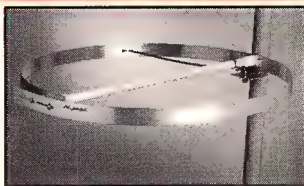
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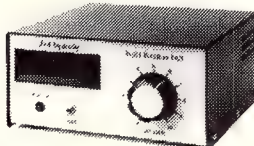
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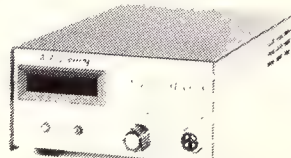
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January, 73, Al. Net Mgr/ess/QNI/QTC: GSFM N1KPT/31/437/109; GSPN K1Z0 33/158/20; TSEN N1VFM 4/64/5; VTNH WA1JVJ 31/175/142/497. Tfc: W1FYR 1779, W1PEX 853, K1TQY 446, WA1JVJ 170, N1KPT 121, N1CPX 79, W1ALE 65, AA1QD 50, KA1OTN 49, WB1GXM 46, K1Z0 31, AE1T 20.

RHODE ISLAND: SM, Rick Fairweather, K1KYI, e-mail k1kyl@juno.com. Home page: <http://www.ri.arl.org>. ASM: N1JFY. ACC: AA1CE. STM: WA1CSO. SEC: N1JMA. OOC: W1AOM. TC: KA1EGY. BM: KA1BNO. SGL: NNK. Pawtuxet Valley ARC had a holiday party in the Coventry Vet's Hall with lots of good food and fellowship. The tablecloth on the steam table caught fire but luckily KE1FE, an off-duty firefighter, extinguished the blaze and the party continued. Blackstone Valley ARC had a computer night at their Feb meeting dedicated to using computers in the ham shack and doing upgrades to systems by N1IMS. New officers at Ocean State ARC are pres: N1SMK, vpres: KC1RI, sec: N1WQG, treas: W1IJ, directors: K1PG, N1XVX, KB1AKD, N1WVP, AA1OT, KB1AAQ. Associated Radio Amateurs of SNE, W1AQ's new station manager is N1IBC who will oversee updating and maintaining the club's HF and VHF stations. They hope to have members operated the club station during meeting nights to promote the Worked Rhode Island award, sponsored for many years by the club. Tfc: WA1CSO 62, K1KYI 6. PSRR: WA1CSO 7111.

VERMONT: SM, Bernie Capron, N1NDN—Did you ever have a month where everything went right? Where everything went smooth and there was very little wrong? This is my first month as section manager where I don't have a lot to report. First and foremost, I would like to report that I will be running for section manager for the first time. I was appointed to this position in May of 1997 and I feel good enough about the direction that we are going to give it two more years. I have an excellent group of people that I work with, and outside of a few minor changes, things will stay about the same. By the time you see this article we will have word out on the ARES training I mentioned in the January issue of QST and we have a few other things to implement as well. Please check out our web site if you haven't already. The address is <http://www.vt.arl.org>. This is the place to find word on events coming up as well as scores of contests and general information. If your club or organization has info to pass on please forward it to me at n1ndn@arl.org and I will get it on the web page.

WESTERN MASSACHUSETTS: SM, William C. Voedisch, w1ud@juno.com—ASM: N1LZC. ASM (Digital): KD1SM. STM: W1SJV. SEC: K1VSC. OOC: N1NYD. January was a rough month for antennas. We are fortunate here in WMA that we were on the fringe of the ice storm. Northern New England states didn't fair as well. Inspect all guy lines for damage before attempting to climb your tower. Let's not have any accidents. Tony, N1NYD, has been appointed OOC. All OOs should direct a copy of their monthly activity reports to him (e-mail n1nyd@juno.com). The NOBARC Web Page has expanded their information coverage. They are doing a great job! A RACES net will be held the first Monday night each month on the .91 repeater at 1915 Z. Stan, KD1LE, presented a program on digital signal processing at the MARA meeting. The presentation was excellent. With the help of Bob, W1XP, they illustrated what the "DSP Blaster" program could do with noise and interference. Tfc: W1SJV 34, N1LJY 76, N1SIB 18, W1ZPB 37, KD1SM 27, N1KXL 34, W1UD 171.

NORTHWESTERN DIVISION

EASTERN WASHINGTON: SM, Kyle Pugh, KA7CSP. SEC: WA5ZAY. STM: W7GB. OOC: KB7HDX. SGL: WB7UEU. TC: N7TOF. ACC: KA2LCC. Neil Gallop, N7LVO, was awarded a Meritorious Service Award by the Spokane Co. ARES/RACES for his long hours of service during several emergency activations and public service events. All the dispatch centers of all fire districts in Spokane Co. and lower Stevens Co. have been consolidated into the Spokane City/County Comm (CCC) Fire Dispatch Center, and the Spokane Co ARES/RACES has met with CCC supervisors for a continuing operating relationship. Very sorry to report about Mike, WY7L, and Shirley, N7JMX, of Ellensburg who were killed in an auto accident on Jan. 26. Mike did a lot of amateur support work along with testing and badgemaking. John, KJ7SI, of Mt. Vernon is new WARTS net Asst Mgr. Hamfests: Spokane Lilac City ARC on April 4; Pendleton, OR, on April 11. Tfc: W7GB 355, K7GXZ 270, KA7EKL 127, KK7T 45, K7BFL 41, W7UVP 32. PSRR: W7GB 138, K7GXZ 132, W7UVP 74. NETS: WARTS: QNI 3074, Tfc 195; NOON NET: QNI 8303, Tfc 292; WSN: QNI 775, Tfc 364.

IDAHO: SM, Mike Langrell, AA7VR—OOC: N7HGV. SEC: K17EP. STM: W7GHT. It's almost that time of year when we start thinking about the snowpucks and the potential for flooding in our state. The water year started out drier that last year, however, the precipitation has gotten heavier as we progress through the winter. Hopefully we won't have any flooding like we did last year. Some people are thinking we may have a real bad fire season this year. What ever might be on the horizon, we need to be prepared to provide emergency communications. If you have anything you want put in this column, please give me call! The Disaster Service Communications group meets on the fourth Tuesday of the month at 7:00 PM out at Gowes Field behind the Boise Airport. Everyone is welcome to attend. 73, Mike, AA7VR. Tfc: W7GHT 204, W7YYH 106, N7MPS 41. PSRR: W7GHT 124, WB7VVH 120, N7MPS 78. Net SESS/QNI/QTC/Mgr: FARM 31/2430/45/NOGR; NWTN 31/2021/63/KC7RNT; IDACD 22/582/31/K7UBC; IMN 31/171/109/WB7VYH.

MONTANA: SM, Darrell Thomas, N7KOR—I would like to recognize those appointed officials within the section who do so much to assist the amateur activities in their areas and section. Those currently holding appointments are ASMs Jack Greenwood, N7WF, and Wayne Van Meter, N7TAE, ACC Eric Martin, K7ABV, BM Pete Peters, W7OW, SGL John Geach, K57R, STM Herb Allard, KA7YYR, PIC Eileen Jones, K7BFJ, OOC Randy Hanrahan, K7PGL. TC Doug Dunn, K7YD, SEC Jim Fuller, N7VMR. These folks deserve a big vote of thanks for their support to Amateur Radio and the ARRL in the Montana section. We also owe a debt of gratitude to our net managers Pete Peters, W7OW, for the Montana Section Net and Les Blevins, N7AIK, for the Montana Traffic Net. It is the dedication to the hobby that these people display that helps keep things happening. In

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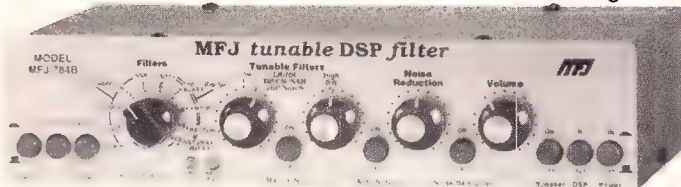
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\$249⁹⁵

NEW!



3400 Hz. This lets you create custom filters for Voice, Data and other modes.

Signals just 75 Hz away literally disappear -- they are reduced 57 dB!

Automatic notch filter

MFJ's automatic notch filter searches for and eliminates multiple heterodynes in milli-seconds. It's so fast, that even interfering CW and RTTY signals can also be eliminated.

You can selectively remove unwanted tones using the two manually tunable notch filters -- an MFJ exclusive. Knock out unwanted CW stations while you're on CW.

Adaptive Noise Reduction

Noise reduction works in all filter modes and on all random noise -- white noise, static, impulse, ignition noise, power line noise, hiss.

The LMS algorithm gives you up to 20 dB of noise reduction. Noise reduction is adjustable to prevent signal distortion.

15 pre-set filters -- factory set or you custom program

You can select from 15 pre-set filters. Use for SSB, AM, CW, Packet, AMTOR, PACTOR, RTTY, SSTV, WeFAX, FAX or any mode.

If you don't like our pre-set filters, you can program your own -- an MFJ exclusive! Save center frequency/bandwidth, lowpass/highpass cutoffs, auto/manual notch, noise reduction -- all filter settings -- in 10 programmable filters.

Plus more . . .

A push-button bypasses your filter -- lets you hear the entire unfiltered signal.

2½ watt amplifier, volume control, input

level control, speaker jack, PTT sense line, line level output. 9½x2½x6 inches.

Plugs between your transceiver or receiver and external speaker or headphones. Use 12 VDC or 110 VAC with MFJ-1315, \$14.95. Cable Pack, MFJ-5184, \$7.95, includes receiver cable, DC cable, 2 open-end TNC cables.

New Features

MFJ's exclusive tunable Spotting Tone™ -- accurately tunes even the narrowest CW filter.

MFJ's exclusive Adaptive Tuning™ -- tuning rate automatically becomes finer as you narrow bandwidth -- makes narrow filters easy-to-use.

MFJ's exclusive FilterTalk™ -- sends precise filter settings in Morse code.

Has automatic notch with variable aggressiveness, new quieter 2½ watt audio amplifier, new speaker switch keeps phones always active.

Manual and automatic notch can be used together. Noise reduction, automatic notch and tunable manual notch can be used when a custom filter you saved in memory is selected.

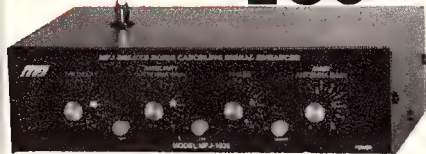
You get an accurate easy-to-use input level indicator, improved manual notch in the CW mode, adjustable line level output, more Mark-Space frequencies and baud rates for data filters and auto-matic bypass during transmit for monitoring CW sidetone, voice or data by sensing the PTT line.

Firmware Upgrade

For MFJ-784, order MFJ-55, \$29.95. Gives you most features of the MFJ-784B.

NEW! 60 dB Null wipes out noise and interference

MFJ-1026
\$159⁹⁵



Wipe out noise and interference before it gets to your receiver with a 60 dB null!

Eliminate all types of noise-- severe power line noise from arcing transformers and insulators, fluorescent lamps, light dimmers, touch controlled lamps, computers, TV birdies,

Add DSP to any Multimode DSP for your MFJ-1278/B



Add "brick wall" DSP filtering to any TNC or multi-mode data controller.

Copy signals buried in noise and QRM.

Under severe QRM, DSP greatly improves copy of Packet, AMTOR, PACTOR, OR, Clover, RTTY, SSTV, WeFAX, FAX, -- nearly any digital mode. Automatic gain control, ON/OFF/Bypass switch. Plugs between receiver and multi-mode. Uses 10-16 VDC or VAC with MFJ-1312B, \$12.95. 4½x2½x5.5in.

MFJ-780
\$99⁹⁵



Plug a MFJ-780 "brick wall" DSP filter into your MFJ-1278/B multi-mode and you won't believe your eyes when you see solid copy from signals completely buried in QRM! MFJ-1278/B automatically selects the correct DSP filter for Packet, AMTOR, Pactor, RTTY, ASCII, FAX, Color SSTV, Navtex or CW.

Plug in a MFJ-780 and copy signals that other multi-modes can't. Some soldering needed.

at a push of a button.

Easy-to-use! Plugs between transmitting antenna and transceiver. To null, adjust amplitude and phase controls for minimum S-meter reading or lowest noise. To peak, push reverse button. Use built-in active antenna or an external one. MFJ's exclusive Constant Amplitude Phase Control™ makes nulling easy.

RF sense T/R switch automatically bypasses your transceiver when you transmit. Adjustable delay time. Uses 12 VDC or 110 VAC with MFJ-1312B, \$12.95. 6½x1½x6¼ inches.

MFJ-1025, \$139.95. Like MFJ-1026 less built-in active antenna, use external antenna.



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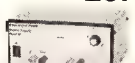


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Sensitivity	<10mV @ 10Hz - 10MHz <20mV @ 10MHz - 50MHz (F-2850 only)	<1.5mV @ 100MHz <5mV @ 250MHz <5mV @ 1GHz <100mV @ 2.4GHz
Maximum Input	100Vrms (F-2850 only)	15dBm



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addition to these key people we have some thirty other active amateurs who are Emergency Coordinators in their local areas of the section. Net/QN/ITC/NN MSN 133/1 W7OW; MTN 2201/79 N7AIK; IMN 281/109 WB7VYH. Tfc: KA7YYR 200, WA7PRD 10. PSHR: KA7YYR 107.

OREGON: SM, Randy Stimson, N27T-ASM: W7FBP. ASM: KF7KE. ASM: KG7OK. ASM: N7QQU. STM: W7VSE. SEC: WB7NML. PIO: KC7YN. SGL: KA7KSK. ACC: AA7OA. TC: N7HMV. OOC: N87J. Well winter is going away and it looks like spring. I have some bad news about two hamfairs. The Keno Hamfair has been canceled. It was to be on April 25th. Central Oregon ARC (COARA) has honored Ken, KC7RIE, as ham of the year. Ken not only worked out the budget, but was involved in all of the events for the year and chaired the Pan American Horse Race. The new officers for COARA are pres Mary, N7RGD, w/ Phil, N7QKR, secretary Cindy, KC7UJD, and treas Ken KC7RIE. The Umpqua Valley ARC announced Richard, KC7DRB, as the ham of the year for that area. Richard has done some much it is hard to list them all in the small space that I have so I will say he was very busy helping other hams and participating in outside activities. I see where McMinnville ARC, that is in Yamhill Co with the ARES group, is organizing a National Weather Service spotter group. The way the weather is going, I think that it might be a great idea. A reminder about the Pendleton Hamfair on Apr 11, 1998: It is their first, so try to be there. I will let you know how well they did. Then the SEA-PAC ham convention is May 30 and 31, 1998. They will have the usual manufacturers as well as all of the other great exhibitors. So come and touch the newest equipment. The new officers at the Sunset Empire ARC are pres Greg, N7RIA, w/ Scott, KC7OOH, treas Jay W7FBM, and secretary Alene, KA7CXP. The Central Oregon DX club is having a QSO party on May 9th, 1998. Check your QST, CQ, World Radio or Ham Trader for all of the particulars. Tfc: W7DRP 347, WA7EES 138, W7WAT 132, W7VSE 128, W7ODG 110, K6AGD 108, N7OKM 72, K7NLM 53 and KA7AID 42.

WESTERN WASHINGTON: SM/TC, Harry Lewis, W7JWJ-ASM/ACC: W7QGP. SEC: N7NVP. STM/NNM: KD7ME. BM: N7CAK. SGL: WB7UEU. PIO: KA7KUR. OOC: W7DNY. Ed Brueette, N7NVP, has accepted the appointment as Section Emergency Coordinator for Western Washington. Ed's previous experience includes 4 years as Kitsap Co EC and 3 years as an Operations Coordinator in Emergency Management. Ed is looking forward to working with the WWA ARES team and will be available at most area hamfests to receive input. Ed sends his first SEC report as follows: Accepting appointment as an EC for Thurston Co is Mike Colyar, K7ITL. Bob Molesworth, KC7HYJ, is the new Mason Co. EC replacing Ron Ohnhaas, K0BQ. Ron was recently recognized by the Co Commissioners for his efforts during the 2-plus years he was EC. Monte Simpson, KB7RID, reports Kitsap Co has moved their VHF nets to 145.43 MHz, PL 179.9 Hz. EC Ed Wirtz, W7JGM, and 22 Skagit. Hams participated in a winter storm drill that included support to 3 hospitals, 2 ARC offices and 6 shelters. Simplex frequencies were used and the need for relays was demonstrated. Formal message traffic training is forth coming. Randy Greeley, NU7D, and other Cowitz Co Hams participated in a tabletop exercise and meeting with local government and response agencies. Marina Zuetell, N7LSL, DEC for Medical Services Communications has received a 50 ft tower donated by the WWDX Club. It will be installed at the Tukwila Group Health Operations Center. Reports from WWA Section Traffic Manager Phil, KD7ME, indicates that HF traffic nets are alive and well. The WARTS net just celebrated its 50th year of operation and the Columbia Basin Net is not far behind. Individual Traffic: K7BDU 284, K7CLL 7, KD7G 16, W7LG 16, K7GLS 67, KD7ME 215, K7MQF 83, W7NWP 28, W7PFD 19, N7PIP 14, W7RFM 165, K7SUQ 14, KA7TTY 14, W7TVA 228, N7YSS 60, W7ZIW 304. The Nontime Net continues to lead in total traffic handled with 292 messages for January with the WARTS trailing with 192 messages handled. Check out the Public Service Honor Roll and you will see the calls of those that individually contribute so much to the continuation of our service. Contributing in January KB7BDU, KD7ME, K7MQF, W7NWP, KA7TTY, W7TVA, N7YSS, and W7ZIW.

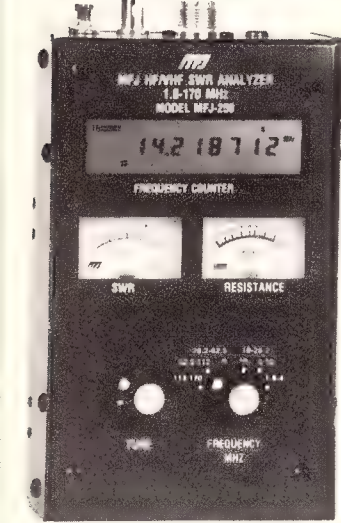
PACIFIC DIVISION

EAST BAY: SM, Bob Vallio, W6RGG-ASMs: W6ZF, WB3FCV. SEC: N4OGL. DECS: WA6TGF/Alameda County, K06JR/Contra Costa County, WA7ND/Napa County, K6USU/Solano County, N6UOU/Training, KE6HC/Administration, KE6NVU/Finance, W6CPO/Technical Services. STM: K6APW. OOC: W6NKF. TS: KF6NY. Congratulations to KA6CHJ of Vacaville for receiving the NCCC's Worked All California County Award, endorsed All 2 meter SSB, 1st VHF, 1st 2 meters. EBARC had around 80 members and guests at their annual Holiday Dinner. KF6FU, Donna Mae Gillett, KD6OKJ, N6MNL, KB6SEI, KE6MSF, WA6TNI & Olga Bier made sure it all ran smoothly. CCCC's new officers are KF6FU/Pres, N6VIF/VP, AC6GQ/Secy, KB6SEI/Treas, N6MNL/Trustee, and KA6TUX, AC6WF, KD6JCT/Dir. VVRC 1998 officers are KD6JSB/Pres, W6MW/VP, KF6KFQ/Treas, KE6IFC/Secy, and Directors KE6MDM, KA6FDI, WB6FIS & KC6WYC. KA6ELQ won a \$500 gift certificate at a radio store of his choice; and donated it back to the club. Henry is truly a club supporter. VVRC congratulates upgrades KE6HDQ to Tech Plus, and K6D1 to Extra. The Klub had 12 members providing comms for the Pleasant Christmas Parade. SBARA's new officers are KE6YKG/Pres, KF6FBN/VP, KF6AGM/Secy & KE6IVA/Treas. HRC's 1998 officers are KE6OID/Pres, W6AT/VP, KD6QW/Secy, N6OJ/Secy, KD6SVS/Sgt at Arms & KC6QHM, Parliamentarian. Oakland ARES members providing comms for the Veteran's Day Parade were KE6SSY, KD6OAQ, KD6OCW & K6GJZ. MDARC honored N6PMF as their 1997 Ham of the Year. SIRARC's new officers are W6ZZT/Chmn, WA6RJI/1VP, KB9M/2VP, WA5HQJ/Secy, W6ZZT/Interim Treas, K6ZYI & WB6LMY/Dir. Tfc: W6DOB 661, W6BUZX 22.

NEVADA: SM: Bob Davis, K7IY-SEC: N7JHE. TC: NW7O. ACC: N7FFP. STM/SGL: N7CPC. PIC: WW7E. Greetings to all section members. As winter begins to loosen its grip on Nevada, the activity levels seem to be growing accordingly around the clubs and organizations. Neil, WA7KCD, reports great success in SNARS efforts to provide communications for the annual March of Dimes Sno-Ball in Truckee

MFJ HF/VHF SWR Analyzer™ with RF Resistance Meter

Read your antenna SWR from 1.8-170 MHz... 10-digit LCD frequency counter... RF Resistance Meter... smooth reduction-drive tuning... simple-to-use...



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Does 2:1 SWR mean 25 ohms or 100 ohms? The new MFJ-259 tells you at a glance!

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Find your antenna's true resonant frequency from the shack.

Tune the antennas on your

tower and watch SWR change instantly as you make each adjustment. You'll know exactly what to do by simply watching the display.

Tune critical HF mobile antennas in seconds -- without subjecting your transceiver to high SWR.

Measure your antenna's 2:1 SWR bandwidth on a single band, or analyze multiband performance over the entire spectrum from 1.8 to 170 MHz!

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\$219⁹⁵ SWR Analyzer™
Same as MFJ-259 but less RF resistance meter. Includes 10-digit LCD frequency counter, full 1.8-170 MHz coverage and smooth vernier tuning.

MFJ-209 MFJ-209 HF/VHF
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MFJ's revolutionary handheld 2 Meter FM Signal Analyzer™ lets you measure signal strength with over 60 dB dynamic range; check and set FM deviation of your packet and voice radios; measure antenna gain, beamwidth, front-to-back ratio, sidelobe suppression and actual feedline loss in dB.

Plug in any scope and your MFJ FM Signal Analyzer™ becomes a service monitor! lets you visually analyze modulation wave forms, measure audio distortion, noise and instantaneous-peak deviation.

You can tune in any signal between 143.5 and 148.5 MHz. It's built-in discriminator-meter function makes accurate tuning simple and easy.

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NAB '98 Booth RL 4311

this year. It appears that several of the Tech crew from the Elko ARC assisted the local chapter of the American Red Cross in installing quite a few radios and equipment that was donated to the cause. Also, the proposed new repeater frequency in Elko will be 146.80 with a PL of 100.0. I would like to also make mention of another job well done. As I have received 3 separate and unsolicited statements, all praising the efforts of Janet Welsh, NK7N, and her VE team. The Rural Amateur Radio Association has been gaining ground in membership, meetings and VE Test sessions, sprinkled through out the Section. Join them on 3965 Saturday mornings at 7:35 AM. George, AA7JZ reports that upcoming ARES/RACES activities are still a few months off in the Las Vegas area. Pat, N7LPT, heading up Wide Area Data Group in Reno, indicates all is well with the new additions of repeaters and equipment to their system, and are working out a few minor logistic problems. Tfc: N7CPP 25, K7OK 10, W7YDX 2.

PACIFIC: SM, Dean Manley, KH6B—SEC: Dennis Carvalho, KH7H. ASM: Harry Nishiyama, KH6FKG. ASM: Lee Wical, KH6BZF. SGL: Ron Phillips, AH6HN. OOC: Chuck Burch, AH6IN. TC: Kenny Bell, KH6AFQ. 1998 BIARC officers: pres. WH6CQH, vp KH6FKG, sec. AH6HB, treas. AH7Y, dir. WH6CWL, NH6MP, KH6IAA, AH6HN, AH6GD. 1998 Maui ARC officers: pres WH6CWD, vp WH6KO, sec N6BMK, treas WH6VH, dir. AH6GR, WH6CRU. Congrats to KH6CC with number 201 on 160. Milolii again on the air by campers Jan 23-25: KH6AFQ, NH6XB, NH6VW, WH6AVF, KH6BMM, KH6DFW, AH7H, KH6AFS, KH6B. Tony, NH6UX, appointed as OO and NM. Please consider participating in local nets: Hawaii Afternoon Net 0200 UT 7088, Pacific Interland Net, 0800 UT 14315.

Friendly Net	1900 UT	7285
EARC Net - Mon	1930w	146.88
EARC Net - Fri	1930w	146.80
Hawaii ARES - 1st Thu	0500 UT	3905
HI QCWA - 1st Mon	0100 UT	7088

Mahalo, 73 and Aloha.

SACRAMENTO VALLEY: SM, Jettie Hill, W6RFF— As February starts, we are experiencing flooding in the SV. This is getting to be a regular exercise for our EC and ARES groups. An ARES group is being organized in Yuba County, spearheaded by Robby, N6PGK, and Kelly Purdum, OES Director. Their initial meeting had a good turn-out and had your SM and the OES Director as guests. Good luck! The Yuba-Sutter ARC is planning a tour of the Pave Paws Radar site at Beale AFB. Amador County ARC held their annual dinner in Jackson and W6RFF, K6WR, W6CF, were guests. ACARC presented a color television and video player to the Senior Service Center in appreciation for their hospitality. ACARC meets at the Center the first Thursday of the month. Bill Anderson, W6GN, was awarded a Distinguished Flying Cross and Air Medal. Rudi, HB9DU, published an article on "the Poor Man's RF-Wattmeter" in the Nevada Co ARC bulletin. KB6OLL has been busy working VHF contests, as we as being Yolo County Radio officer. KC6ZWT earned the "Worked All Calif Counties" award by working all 58 counties on 2 meters! El Dorado Co ARC operated AG6AU during the 150th anniversary of the discovery of gold in Coloma. Their call is appropriate for the mining area, Silver (AG) and Gold (AU). This will be a 2-year celebration. I presented a 100% ARRL membership to the Mother Lode DXCC. Ken, K6PU, is now K6DB. River City ARCS will hold their 1st Swap Meet on April 18 at Bella Vista High School and 2nd Swap on August 15th at same location. North Hills RC will hold their annual Ham Swap on Sunday, May 31 at Bella Vista High School. Louis La Bonte, K6KDU, became a Silent Key. Section net: first Sunday of month at 8 PM on 146.085+ 73.

SAN FRANCISCO: SM, John Wallack, W6TLK—ASMs: N6KM, K6EAAQ. OOC: KD6HQ. PIC: N6BWS. SEC: W6TMS. STM: AB6EU. TC: N1AL. It is with sadness that I report the following Silent Keys: WA6BRV and KG6KG both of Humboldt County. El Nino has been very active in the SF Section this winter. Many thanks to all the ARES, RACES, ACS, CDF and Red Cross radio amateurs for your long hours of emergency service on behalf of your communities. Your outstanding efforts are appreciated by all the agencies that you have served. Again, Amateur Radio has proven to be a valuable community resource in times of disaster. WA6QVU of Lambda ARC reports their club repeater is operational on Twin Peaks and SF and is shared with SF ACS with the support of SF OES. HAMFEST '98 will be held on August 1 at the Redwood Acres Fair Grounds in Eureka. W6GGR reports a new meeting place for hams in Humboldt County is at the Pantry in Eureka every Thursday at 1200. K7WWA of Willits ARS reports 2 packet nodes have changed frequency; MENDO is on 145.690 and LAY is on 144.390. I'm looking for a ham to manage the SF Section web site. If you are interested please contact me at w6tk@arrrl.org.

SAN JOAQUIN VALLEY: SM, Donald W. Costello, W7WN—ASM: Mike Siegel, K6PFR, ASM Technical: John Lee, K6YK. SEC: Larry DeWitt, WB6GJT. OOC: Victor Magana, AA6AH. As I write this column in February the rains are still falling and there has been much flooding in the San Joaquin Valley Section. I would like to thank Mr Larry DeWitt, WB6GJT, and Mr Charles Brashear, KC6YCH, for their work with emergency communications in Stanislaus County. This is the second year that Stanislaus County has had to deal with flooding. Merced County has little recent history of flood problems but, volunteer hams responded to a call that I received one evening from the Merced-Mariposa Chapter of the Red Cross. Within thirty five minutes volunteer hams appeared at shelters in Merced and Gustine and manned the Red Cross office in Merced. My thanks for a job well done go to Mr Kent LaBar, K6IN, Harry Mills, AB6KF, and the many volunteers from both Stanislaus and Merced Counties. In the next Section News, I will have all of the names of individual ham volunteers listed. I have received word from John Lee, K6YK, that there were lots of SJV hams active in the VHF SS. He reports that one station in another Section commented that "all the VHF activity is in the San Joaquin Valley Section and Sacramento Valleys." The station transmitting was in the Bay Area, reports John Lee. Some of the hams involved were WA6YDI, N6IFW, KD6RRV, N7STU, KK6TE, N6AJ, KD6FJS, KK6LR, KD6KYY, NT6K, KD4ZJH, N6PYI,

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SSD-6	160-80-40-20-15-10M Space-Saver Dipole, 71 ft. long.....	\$146
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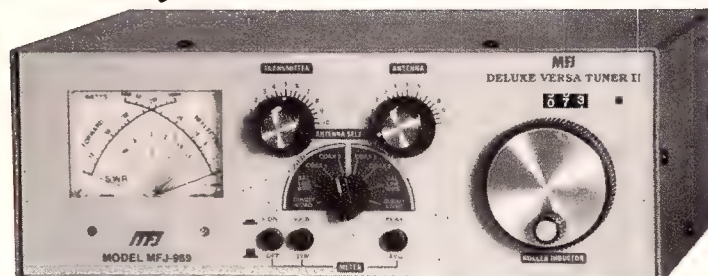


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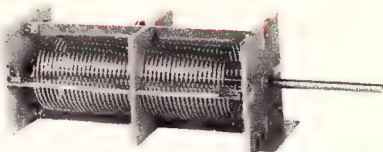
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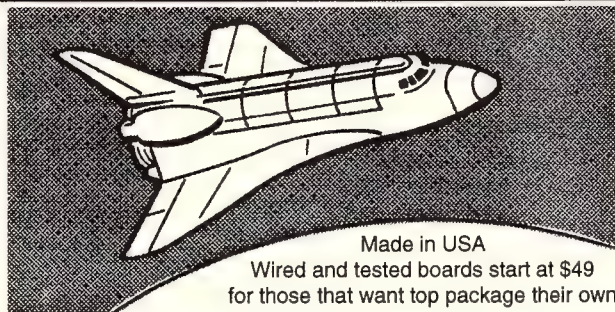
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ROANOKE DIVISION

NORTH CAROLINA: SM, W. Reed Whitten, AB4W—ASMS: AB4S, KE4ML, KC4ACE. SEC: K4MPJ. ASECs: WA4MOK, N4UCO, KD4RYE. STM: K4IWW. ASTM: W4EAT. TC: K4ITL. SGL: K4IAN. OOC: W4ZRA. PIC: KN4AQ. ACC: W4CC. BM: KD4YTU. Section Web Site <http://www.ncarrl.org>. Congratulations to Tammy, KC4TUM and the Piedmont Emergency Training Net (PETN) for the success of their traffic handling contest. The volume of replies from many other sections, and esp. Their VHF nets, was overwhelming. ARES and NTS have a mutual common goal, emergency communications. I am pleased to report that ARES and NTS work together toward that goal in our section. New DEC's are Dave, KE4JHJ, Area 9 (former Forsyth EC), and Bill, AE4GA, Area 11. The counties in the Central Branch (Areas 6-10) have been reorganized and our DEC's have shifted assignments to match. Sorry to report that Jackson Co. EC, Emmett Carter, KR4LZ, is a Silent Key. He helped ARES grow in western NC Gastonia Hamfest May 2 at a new location. 1997 NC NTS Totals:

Net	QNI	QTC	QND	Sess	NM
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Section Nets:

NCEN	6094	1586/1309	5336	365	KB4FWL
NCMN	5715	1649/1455	5382	365	KI4YV
CN	9389	3420/3181	13457	730	K4IWW
CSN	2991	451/394	8160	365	AE4EC

Local Nets:

CNCTN	10856	712/638	6494	365	KE4AHC
PCTN	2903	337/313	2494	365	KC4MWT
ENCTN	3607	537/513	3840	365	KE4JWL

Non-NTS Nets:

PETN	11572	244/230	11738	244	WB4HRR
THEN	7569	708/509	7471	365	K4CWX
RARS	4466	421/272	7365	350	KE4QQO
CFEN	3067	128/128	3101	120	KR4LS

TOTALS:

1997	68229	10193/8942	74838	3999	
1996	78037	12054/10662	95034	4608	
1995	79366	13008/11439	100798	4589	
1994	79754	13501/11749	104305	4928	
1993	76688	12473/11104	94106	4725	
1992	66206	12724/10720	80638	4449	
1991	61090	11142/8936	73060	4604	

Jan Tfc: W4EAT 306, AB4E 273, KI4YV 154, K4IWW 141, W4IRE 111, K4CWX 106, K4AIF 99, AA4YV 84, KE4JHJ 67, AB4E 59, AF4NC 54, K4DDY 46, KE4AHC 43, AB4W 42, KB4FWL 34, KE4JWL 26, WD4MRD 26, N4SHE 24, N4YXU 20, N5XUJ 18, N4JTG 17, N2JLE 15, NT4K 13, W4DYW 13, K4ROK 12, W4ASRD 11, K4AKTU 9, KE4YMA 9, KR4ZJ 8, WB4SGA 7, KT4CD 6, N4WZH 5, KF4PAK 4, W4AZWC 3, KB4USN 2, KB8UCZ 2.

SOUTH CAROLINA: SM, Les Shattuck, K4NKK—Great to see all at the Charleston hamfest on Feb 7th. I had a great time and will look for you at future South Carolina hamfests. Club meetings I expect to talk at are Feb 17th in Laurens and Feb 26th at Anderson. Also March 6th in Rock Hill and of course I will be with Director Kanode at the big Charlotte Hamfest. For April I will be hamfesting in Aiken, so please come and visit the ARRL table. A change in staff has taken place. Effective Jan. 1, 1998, Sue, N4ENX, is the new OOC. All OOs please take note and send her your reports. This is being written for the April issue and the month of April is the 40th anniversary of the South Carolina SSB net. We have a special gift for the net when we all meet on May 9th for the Upstate Hamfest that will be held in Anderson. Congratulations to our PSRR winners: K4AUIV 134, AE4UB 129, KT4SJ 110, K4ALRM 105. Traffic: AE4UB 253, KT4SJ 152, K4ALRM 75, W4DRF 70, K4AUIV 55, W4AUGD 42, KT4FP 38, W4CQB 26, W4BWTY 24, WD4BUH 23, K4GDL 17, W0RXR 10, W4EUIU 4, WT4F 4, KF4HAV 4, KE4YCI 1. Congrats to Ken, AE4UB, on his appointment as net manager of the Carolinas slow net.

VIRGINIA: SM, Chris Wright, KD4TZN—ASM: AF4CD. STM: N4GHI/WA3TAI. SEC: K4EC. ASEC: N4SCK. ACC: KA4YUY. SGL W4UMC. PIC: N0RDQ. TC: W3EDR. Hello everyone. Wow, how time flies. We are already well into 1998 and the clubs are getting geared up for springtime activities. It is great to hear from all of the clubs and to hear everything going on in the state. I wish I had room to mention all of the clubs in the article, but space will not allow. The HF bands are getting better as times goes on, and it is a lot of fun to hear all of the activity on 10 meters again. It has been a long time coming for the bands to open back up. The traffic nets are doing real good and they really appreciate your support and wish you would check in more often. All the nets in the state are a great place to meet and learn what is going on in the state or your local area. I cannot say enough about the people who have helped me in the past 2-years of this office. The people that I'm talking about are mentioned at the beginning of this column and at ARRL HQ. A very tremendous thanks to each and everyone of you. 73 for now, and hope to hear you on the air. Tfc: N4GHI 435, K4DOR 306, K0BS 299, KE4PAP 246, K4MTX 176, N4ABM 130, WD4MIS 98, WB4ZNB 92, W4JLS 84, W4UQ 79, N6ANQ 74, KF4FTX 73, WB4KSG 71, WB4FLT 61, K4YVX 60, KE4YXW 59, KF4LBD 46, W4TZC 42, W4YE 37, KD4JMA 30, W4DOX 29, W4HU 24, K4IX 23, K4PRR 21, KF4DUS 11, W4TY 10, WB4UHC 8, W3ATQ 9, KF4HKW 7, KE4HFX 7, KE4NYY 5, KN4US 2, W4IN 2, K4JM 2.

WEST VIRGINIA: SM, O.N. (OLIE) Rinehart, WD8V—STM: WD8DLY. SEC: K8QEW. ASEC: KA8ZOO. SGL: K8BS. TCC: K8LG. OOC: N8OYV. ACC: WD8MKS. Digital: K8MHR. APRS: W8FX. El Nino or not El Nino, this has been a really notable month for weather! It is almost beyond understanding that the southern and eastern parts of our relative small geographic area can have such drastic weather differences. Here in the Charleston area we can say we have had a mild January while the Beckley-Princeton and Greenbrier Valley areas have set records for snowfall in a 24 hour period. This has been a vivid reminder for us all that, back in the command center and from a fixed, warm, cozy, functioning operating position we must strive

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to understand the situation at the "front line." A report of 52" wet snow and still falling from a mobile at the site of a downed power line or collapsed building is sent with a great deal more effort and concern than we sometimes realize! We, here in WV as well as those in Up State NY, re-learned the value of simplex FM VHF operation. That along with plain old Ham Radio curiosity has prompted the resurrection of simplex net's and testing equipment in the section: PSHR: WD8V 258, WD8Y 190, WD8DHC 138, W8IMX 138, KA8WNO 119, WD8LDY 118, W8JWX 118. Tlc: KA8WNO 271, WD8DHC 138, W8IMX 60, W8FZP 30, K8QEW 53, W8FNF 1576/193/27.54 N8QYY: W8MDN 939/33/10:28 WD8DHC: W8VNE 253/105:05:25 W8IMX: W8VNL 175/28/03:35 W8IMX: ARES/RACES: 50 NETS/1219/39/27:54, K8QEW: DIGITAL 49/90/24:15 K8MHR.

ROCKY MOUNTAIN DIVISION

COLORADO: SM, Tim Armagost, WB0TUB-ASM: Jeff Ryan, N0WPA. SEC: Mike Morgan, N5LPZ. STM: Mike Stansberry, K0TER. ACC: Ron Deutsch, NK0P. PIC: TBD. OOC: Karen Schultz, KA0CDN & Glenn Schultz, W0JUR. SGL: Mark Baker, KG0PA. TC: Bob Armstrong, AE0B. BM: Jerry Cassidy, N0MY. Some plain and fancy scrambling over the mountain...seems as though the Western Colorado ARC had their swap planned for the second of May when the National Guard booted them and now their swapfest is a week later, the ninth of May! Mark your calendars and if you need a table or information, contact Diana Dodd, KB0REW at 970-243-7441. The week of the 2nd is still a swap weekend with the Pikes Peak bunch holding their test on that day in Colorado Springs. More to come! It must be getting close to spring, what with all the swap fests happening. Who needs the ground hogs?? The ARA's swap was nicely attended and nice to see and visit with old and new friends! Jim Dallin, KD0NT is still working for help with the parades and gave a hand at the swap. David and Judy Richendier, WD0HNQ and WD0HNP, were looking good up on the stage. A nice swapfest by all accounts! Thanks to all not mentioned that helped make it a nice one! Tlc: NTS traffic totals: W5JCJ 434, WQ0OB 192, NU0OD 63, K0TER 27, KT0H 26. Colorado Amateur Weather Net (CAWN) totals: WB0VET 191, W0WPD 1133, W0LVI 707, W0GGP 611, N0JUS 393, N0DKK 445, KD0WT 181, K0CVL 27 8, KB0ZMY 269, K0YFK 340, AA0ZT 267. 73! WB0TUB.

NEW MEXICO: SM, Joe T. Knight, W5PDP-ASM: K5BIY & N5ART. SEC: K6YEJ. STM: N7IOM. NM: WASUNO & WASUWY. TC: W8GY. ACC: N5ART. New Mexico Roadrunner Net meets daily on 3939 @ 0100 UTC and handled 122 mgs with 1177 checkins. New Mexico Breakfast Club meets daily, 3939 @ 6:30 AM and handled 195 mgs with 1144 checkins. Yucca 2-mtr Net 7/818 handled 15 mgs with 677 checkins. Caravan Club 2-mtr Net, 66/06 handled 2 mgs with 67 checkins. SCAT Net, 66/06 handled 21 mgs with 1033 checkins. Four Corners Net handled 20 mgs with 400 checkins. GARS Net handled 7 mgs with 39 checkins. QCWA Net with 21 checkins. Rusty's Raiders, 94/96, with 116 mgs with 727 checkins. Congrats to the Valencia Co Amateur Radio Association for an excellent newsletter. What a fine job they do for such a small club. The editors of all the club newsletters are to be commended for an outstanding job. Thanks to K5TE, Tom Ellis, for a wonderful job of planning and putting on the Winter Tailgate at ABQ. Tnx also to WASIHL, K5AYV, WB9ERE, K5G5V, WB5EKP, N5JJDY, N5OBZ and others for their devotion to keeping the Mega-Link/Upper Rio System going during the hard winter storms. Tnx also to W8QD and crew for their efforts on the .74 repeater. The Central NM Swapfest/Tailgate will be held April 25th in ABQ. Sorry to report the passing of K5HC of Alamogordo. Tnx and vy best 73.

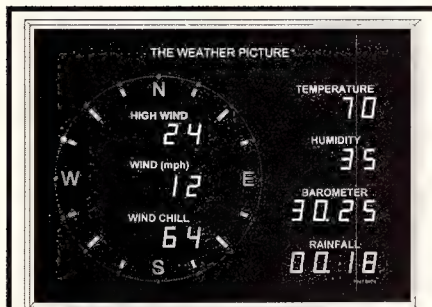
UTAH: SM, Jim Rudnicki, NZ7T-Greetings. First of all I must apologize to the entire section for essentially disappearing off the bands for the last three months. I have had several very serious family issues that have been taking up most of my time. Although radio is important, family comes first. Between the family issues, and the fact that my two meter mobile rig is broken, I have been fairly invisible. Hopefully as I head into spring, I will be more active and visible. Thanks for all the support and help during the past few months. Now onto other things. A new club is getting started in Eastern Utah! Say hello to the Borderline ARC in Vernal. They are a new revitalized group with around 35 members and starting to grow! They alternate their monthly meetings (3rd Saturday's at 6 PM) between Vernal, Duchene, and Roosevelt. The Prez is Julie Harrison; N7VJO, VP: Kathy Robinson; KB7YUI, Scty: Mike Dunker; AA0NJ, and Treas: Jay Hansen; KA7BPB. You can meet most of these folks on the Blue Mtn. Rptr 147.100+ (136.5 PL). Be sure to say hi if you pass through that neck of the woods. They are also interested in starting an ARES organization for Duchene & Uintah Counties. Hopefully ye old SM will be able to come and visit this spring! Tlc: WMEL (Dec): 87, (Jan): 64, 73 de NZ7T.

WYOMING: SM, Bob Williams, N7LKH-On Jan 12 the Albany County ARES group had the chance to earn their pay. The telephone system at the Laramie hospital failed and the EC, Mac, WB7K was called to provide communication both internal and external. He rounded up AF7E, N7JT, N0TQ, KC7ZRU and KC7PBB for action with KC7UGD and KB7VQV on standby. They provided communication for 1/2 hours until the phone problem was fixed. It was a failed UPS. Fix was to switch to commercial power. Interesting problem. In April the WY Section Hams are providing the communications for the Wyoming March of Dimes Walkathon in 16 Wyoming cities. This is just one more opportunity for the Hams to provide the public service that justifies assigning spectrum space to them. The Wyoming Ham activities schedule for this summer is as follows: Wyoming Hamfest, Rawlins, WY, 23-24 May; Hardin Picnic, Hardin, MT, 7 June; Glacier Hamfest Essex, MT, 17-19 July; WIMU Jackson, WY, 1-2 August; Meadowlark Hamfest, Willow Park, WY, 13-16 August, High Plains Roundup Yellow Pine, WY, 11-13 September. Hope to see you all at these. Please help with the Walkathon.

SOUTHEASTERN DIVISION

ALABAMA: SM, Scott Johnston, N4YYQ-Hello to all. From the looks of things, hamfests are well underway. The Blackwarrior swapfest in Tuscaloosa, AL, was held March 7, and as usual, it was great. Albertville, AL will hold their hamfest April 3-4, 1998. Make plans to attend as the fine folks there always do a fine job. Birmingham hamfest will be

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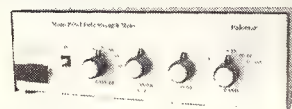
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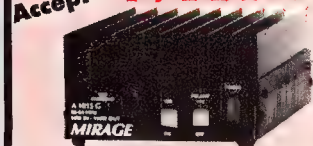
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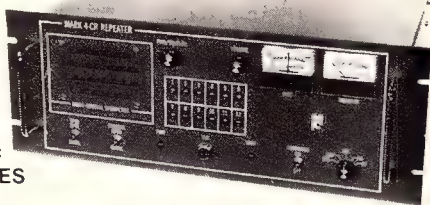
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April 18-19. This will be the southeastern division convention. Ellis Dobbins, K4LI, has done a terrific job in getting this underway. There will be a combined meeting on Saturday and Sunday. Drop by and join us. Also, for the YLs, be sure to stop by the YLRL table. Roseann, N4ZNO, District 4 chairwoman will be glad for you to visit. Adding to our list of appointees serving ARRL Alabama, will be KT4XA, Christopher Arthur. Christopher will serve as an ASM assisting Norris Landry, KB4KOY, with youth services. Randy Kay, KE4EFI, will be serving as an OES. Randy does an outstanding job in assisting when the need arises. Thanks to both gentlemen for their willingness to serve. We appreciate it. Be sure to keep those reports coming! In Roseanne, the kids, and I want to extend a most Happy Easter to everyone. Tfc: WB4GM 323, W4PIM 187, W4CKS 185, N4YYQ 93, KC4RNF 79, N4ZNO 45, AC4RS 35, W4X1 30, AE4WP 29, KL7Q 22, W4ZBA 22, AF4EG 21, W4DGH 16, W4QAT 15, WB4TVY 14, KD4PDQ 11, KR4ZO 10, KD4TQN 6, KE4OLE 0. Till next month, 73, Scott N4YYQ.

GEORGIA: SM: Sandy Donahue, W4RU. ASM/So Ga: Marshall Thigpen, W4IS. ASM/Legal: Jim Altman, W4UCK. SEC: Tom Rogers, KR4OL. STM: Dick Baxter, K5TF. SGL: Charles Griffin, WB4UVW. TC: Eddie Kosobucki, K4JNL. ACC: Jud Whitley, W4NZJ. OOC/RFI: Ed Tanton, N4XY. Georgia will host a regional ARES conference June 20 in conjunction with the Atlanta HamFest. Representatives from national served agencies will attend to give talks and see demonstrations of our capabilities. If you would like to attend contact KR4OL for more details. Congrats to Robert Burton, KD4YDC, named ARES Amateur of the Year Jan 24 in Macon. The Athens ARC hosted a group of girl scouts at the club shack. The girls talked to Athens area hams on the club's repeater and on 10 mtrs. In April: 3-4 Southeastern VHF Society 2nd annual VHF-UHF Conference in Marietta. web site: <http://www.akorn.net/~ae6e/svhs> April 18, Warner Robbins Hamfest on airbase there. Tfc: (Dec) K5TF 264, WB4GGS 165, WJ4C 102, K1FP 96, W4AET 90, KA4HHE 75, K4BEH 46, KE4NAY, 14, K4JNL 8, W4WJK 4, K4BAI 4, W4RU 4.

NORTHERN FLORIDA: SM, Rudy Hubbard, W4PUP—ASM-APRS: WY8O. ASM-YOUTH: KO4TT. ACC: W4UE. OOC: WB4GHU. PIC: KF4HFC. SEC: W4NDA. SGL: KC4N. STM: WX4H. TC: KO4TT. PACKET: N4GMU. The Orlando Hamcation will have taken place when this is printed in QST. However, at the Hamcation, we will have tried a different approach to the Forums. The purpose is to try a different approach in an effort to reach more hams, generate more discussions on various topics, offer suggestions to new hams coming along. Many things are affecting the amateur participation, such as e-mail taking on more of the traffic handling, less people checking in on traffic nets, more and more are involving themselves on web sites and interest. Another idea for the Section is to have more meetings in the Districts as oppose to the one meeting in Tallahassee each year at the State EOC. It is the opinion of some we can reach more people, and have a better feel of the local activities. Certainly, we want to improve in any way possible. Your ideas are welcomed, and hopefully, you will contact the Staff and myself of your thoughts. By the time you see this in QST, we will have some feeling as a result of the Orlando Hamcation. There are some that are not familiar with some of the ARRL programs, and perhaps in this approach we can present other aspects of interest and opportunities to the members as well as non-members of the League. 73, Rudy. Tfc: NR2F 321, AF4GF 204, KE4OAV 157, KF4NFP 151, W4NDA 149, WB2FGL 148, AD4DO 126, W4APU 95, AD4BL 84, KF4TQX 71, KD4SIV 68, KD4TOK 65, W5MEN 61, W1UKR 55, KS4DW 51, KS4FB 51, N0ZO 38, KJ4HS 37, KD4JL 36, W4KIX 33, KC4FL 32, KB4DCR 31, KK4ND 26, W4EYU 25, WB2IMO 24, N4GMU 24, N4JAO 19, W4IRWO 16, AB4PG 12, KE4ZTP 12, WB9GIU 10, KE4BMI 8, AD4QH 6, WX4J 4, W8IM 2.

SOUTHERN FLORIDA: SM, Robert "Rip" Van Winkle, AA4HT 941-853-1400—ASM: KA4FZ 941-574-3467. ASM for Youth Activities: WB9SHT 407-336-5608. STM: K4PG (WV5Z) 407-496-5257. SEC: W4SS 561-967-1477. Asst SECs: WB2WPA 341-775-2397. KD4GR 954-748-0775. TC: K1ATF 954-791-4275. BM: W4EIC 941-543-4853. PIC: WA4ATF 813-733-9441. OOC: WB4GHU 941-665-6708. ACC: W3BLW 813-541-2895. SGL: KC4N 904-385-5924. Pkt Mgr: KB4VOL 407-546-2532. It was great news to learn that Al Burke, W3VR, and Mae Burke, W3CUL (SK), were selected by the ARRL Board of Directors to receive the 1997 ARRL International Humanitarian Award. The award was in recognition of their lifetime of public service of traffic handling "and for their unique dedication to this facet of Amateur Radio." Al Burke, W3VR, still lives in Seminole and he continues to be a top traffic handler in the Southern Florida Section. Our sincere thanks to Merv MacMedan, N6NO, for the great job he did in preparing the information on the Burkes to be presented to the Board of Directors. Congratulations to the Southwest Florida Traffic Net on celebrating twenty years of being a traffic net. The Net Manager, Earl, K4FQU, reports that Blaine, W4EIC, and Basil, K4ENA, are still active in the net and were among the first checkins twenty years ago. The net originally started as the Fort Myers Amateur Radio Club Net but was changed to its current name in February 1978. Plans are under way for this year's ARES/RACES Forum to be held at the Florida Governor's Hurricane Conference. The Conference will again be held in Tampa and the ARES/RACES Forum will be held on June 2, 1998, and probably will be held in the usual afternoon time slot. The forum is recommended for each county EC and any other interested ARES members that can attend. Hopefully, I will have additional info on the Forum for next month's column. Alan Gauzens, WA4ATF, PIC SFL, is looking for volunteers to fill the Public Information Officer (PIO) position in several counties. He has openings in Glades, Hardee, Hendry, Hillsborough, Lee and Monroe Counties. The PIO position is very important in obtaining good relations with the general public and the ARRL provides excellent material to help a PIO and make him feel comfortable in his position. If you are interested or would like additional information, please contact either Alan or myself. Alan's email address is aj_gauz@juno.com. My phone number and email are on page twelve. Gary Arnold, WB2WPA, Asst SEC SFL, reports that the State of Florida EOC is planning another hurricane drill this year during May 11th thru May 15th and it will involve Southern Florida again. It appears Hurricane "Zeke" will come on land around the Collier County area. There will be more information

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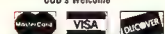
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When you get there, set it on a table or desk and enjoy ragchewing or DXing.

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coming out on this exercise so watch this column or check into the Southern Florida ARES Net on Saturday Mornings at eight AM on 3940 kHz. Also, here is the address for the Southern Florida ARES Homepage http://www.naples.net/govern/county/emrgmt/sfl_ares.htm. In case you haven't heard Kevin Bunin, STM SFL, took advantage of the vanity call program and changed his call from WV5Z to K4PG. Don't forget the ARRL Information Net every Saturday Morning at 7:30 AM on 3940 kHz. 73 de AA4HT. Tic: W3VR 1998. WA9VND 758, K4SCL 464, AB4XK 441, KB4WB 316, KC4ZHF 315, KA2YZM 255, W4DL 250, KD4HGU 182, K4PG 169, KD4GR 165, WB4PAM 138, K4FQU 128, KA4FZ 124, KE4IFD 124, WA4EIC 122, N1RT 122, AA4HT 115, KD4JMV 99, W4DWN 81, K4RBR 78, K2GNZ 64, WD4JNM 44, KT4XK 40, WA4CSQ 26, KB4MON 26, KE4WBI 24, W4ZVD 24, KE4UOF 19, W1KAM 18, K4OVC 9, W9LBY 8, W4WYR 8, WB4TOV 7, W4MOT 4, K4ENA 3.

VIRGIN ISLANDS: SM, John Ellis, NP2B, St Croix—ASM: Drew, NP2E, St Thomas. ASM: Mal, NP2L, St John. SEC: Vic, WP2P, St Croix. PIC: Lou, KV4JC, St Croix. ACC: Debbie, NP2DJ, St Thomas. NM: Bob VP2V1/W0DX, Tortola. Things rather quiet this winter, enjoying very nice WX, lowest temperature so far has been 70 degrees. SM and hopefully a few others planning to visit Miami hamfest, always a good show and an incredible flea market. Welcome back to Judy & Gil, NP2IE & KP2U. Jerry, WB6RCN is actively working on Windows 95 with his new machine. Chuck, WP2AAA is about to come up with a new machine himself, as the battery on his old motherboard leaked and deposited "green stuff" all over the circuitry. Lesson to be learned, especially in this salt air atmosphere, check any batteries or battery terminals in your rig, computer, whatever. There are dissimilar metals there plus even lithium batteries will leak! Get those batteries out of there at the first sign of oxidation or discoloration. That's about it, when you come down, bring your HTs, we have 5 local repeaters (146.63, 146.73, 146.81, 146.91 and 147.25) and they all work good! 73, John, NP2B.

SOUTHWESTERN DIVISION

ARIZONA: SM, Clifford Hauser, KD6XH—Have you reviewed your station for compliance to the new RF exposure rules? If not, please review the January issue of QST or see the ARRL web page. I did not do a good job of explanation of the RF exposure rules at the CADX club meeting. Sorry fellows, I will try to better next time. Presentations at Scottsdale, Green Valley, and Payson ARCs went very well. Repeater frequencies are getting few in the metropolitan areas of Tucson and Phoenix. We must be able to accommodate all aspects of Amateur Radio to include simplex frequencies, Amateur Radio television frequencies, packet, etc. If you have a set of assigned repeater frequencies that are not being used, please contact Ralph Turk, W7HSC, so they can be reassigned. We don't want to interfere with established repeaters and other people would like to have their own repeaters placed in operation. If you have any questions on repeater interference, contact me or my of my three (3) Official Observer Coordinators, Lance Halle, KW7LH, Jim Cole, N7FD, or Alan Unangst, WC7R. The ARRL board of directors did not do Amateur Radio any good by not advocating changes to the Amateur Radio license structure. Board action was to not recommend any changes to the FCC. Also the DX 2000 proposal decision by the board was not very popular with most DXers. Ted Downing, W7KEY, and crew are making good progress with the city of Tucson over amateur radio tower restrictions. All parties agree that the antenna ordinance passed is only to be enforced for wireless communications towers. Even though the city of Tucson has no intention of restricting Amateur Radio towers/antenna with this ordinance, we are working with the city planning department to Land Usage Code wording change. Please be careful and do not allow your city or county to change the land use codes in regards to towers without allowing for Amateur Radio exemptions. The next hamfest is at DeVry on Dunlap on 18 April 1998 starting at 0600 hours. Talk-in is 147.280 (+) MHz. Contact George, KQ7C, at 602-274-6212 for all information. Nets: ATEN 1002 QNI, 89 QTC, 31 sess; CAN (2M) 259 QNI, 49 QTC, 31 sess. Tic: K7VVC 809, AB7NK 148, W7EP 67, W7DNJ 9.

LOS ANGELES: SM, Phineas J. Icenbice, Jr., W6BF—Our Web Page is up and working and should be linked to the Southwestern Division and the ARRL HQ. The most used listing is for Club Speakers. With your help we will try to keep this up to date and usable for new Club Officers. Many new Club Officers ask about "honorariums." My answer is if your guest speaker is in business and selling equipment or service for a price. You should expect these speakers to advertise in your bulletin. If your speaker or speakers presents a good program (non pecuniary) and passes out printed information, the least you can do is buy their dinner or pay for their trip. It is difficult to attract good speakers and expect the speaker who is not selling anything to donate repeatedly to many clubs just for the sake of presenting their program to club after club. Traffic totals for AD0A, Jerry, 90 and W6SX, Hank, 34. A special dinner was held in honor of Archie Willis, W6LPJ. This special celebration was arranged by K6OHM, John Thompson, for Archie's 25 years of service as the ARRL QSL BUREAU Manager for the 6th district. Congratulations Archie, sorry that we all couldn't be there to wish you well for the next 25 years. We would all be remiss if we did not salute Rosemary too. Archie has always maintained that you should never accept a volunteer job that your xyl could not do better. Twenty-six hams were present to help Archie open his presents. The appreciation for Archie and Rosemary must be terrific because this grand affair was on Super Bowl Sunday. At a separate appreciation ceremony; Roy Mc Fall, WA6GGB, was honored for his selflessness and devotion to duty for managing the well-known "Kaddidiehopper's Net". This net meets daily, on 7268.5 kHz for the service of others. These fine operators have been active for over three decades. Roy, like Archie, is one of those outstanding personalities, dedicated to Amateur Radio and the Service of others. One of our great philanthropists, mentor, father and friend of everyone in the LA area Harry Appleton, W6YRG (K6DZT), is a Silent Key. Harry and his company, National Wire & Cable, were generous givers of time, money and equipment to Amateur Radio in this area. 73 de W6BF, Phineas.

ORANGE: SM, Joe H. Brown, W6UBQ—ASMs: Riv Co-Joe, K06XB 909-685-7441. Org Co-Art, W6XD 714-556-4396. SB Co-James, KE6LWU, 909-824-2454. Sec News/

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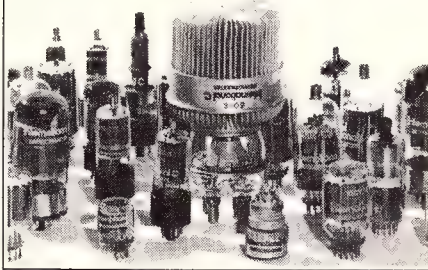
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—Carlos, CT1BOH/P4ØE"



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PIC-Gwyn, KE6JOF 909-685-7441. SEC: Dean, KG6YS 909-687-8878. Words of Wisdom: Fullerton RC's pres, John, KD6PGC, reminds us all that "if you think there is something the club should do which it is presently not doing, let (your club's President) know." The Orange Section's new Tech Coord, Art Sutorus, KQ6HF, is looking for hams interested in being Tech Specialists to contact him at 909-734-1485, or e-mail asutoru@pe.net, or packet KQ6HF@W6JBT#SCA.CA.USA.NOAM. Newsletters keep coming in showing new club officers, among which are the following—AARA: Larry McDavid, W6FUB, Pres; Jim Edds, KA6G, VP; Bill Godfrey, KC6KRW, Treas; Dick Hojaboom, WA6YCG, Sec BCWS: John Anderson, AB6ED, Pres; Tom Cox, K6RMJ, VP; David Warrington, KE6NHV, Sec; Kathy Visser, KE4DTU, Treas Fullerton RC: John McCauley, KD6PGC, Pres; Steve Belasco, N1BK6/6, VP; Cheryl Thorpe, KE6TZU, Sec; Mike Cramer, KC6YHM, Treas. Lee DeForrestARC: Rod McHenry, N6CG, Pres; Glen Vaughn, KD6NZV, VP; Joyce Vaughn, KD6RXQ, Sec; Mark Thompson, KE6KOE, Treas. MARC Ray Poisson, K3USG, Pres; Den Winberry, KF6AZG, Treas; Glenn Miller, N6GIW, Sec. So CA DX Club: Will Angenent, KN6DV, Pres; Harvey Laidman, W8DX, VP; Jim Zimmerman, N6KZ, Sec; Charlotte Iseda, KB6FXS, Treas. Corrections: GTARC: 1st VP Harm Wyma is really Harm Wijma, AC6VN; and 2nd VP Jurgen Mank is really Menk, WE6MT. WARA: Dino Darling, K6RIX (corrected call sign). Sorry, fellas. CNARC has officially renewed as a Special Service Club. Hats off to your membership! Autonetics RC's V-P Jim Heiertz, KN6BU, touts that "This year [the club] had a bumper crop of good speakers" including ATV, DX, RACES, and equipment presentations. STM N6GIW reports for January '98: Traffic totals: N6GIW 253, KO6RZ 252, W6QZ 108, KC6SKK 78, N3IVO 26, Digital traffic: N6GIW NTS Mailbox 262, W6QS NTS BBS 89. PSRR: W6QZ 148, KO6RZ 114, KC6SKK 110, N6GIW 93. Net Mgr, KO6RZ, reported SC NV 31 Sess, QNI 304, QTC 105. Vy 73, KE6JOF.

SAN DIEGO: SM, Tuck Miller, K6ZEC 619-475-7333—SEC: Pat Ryan, KC6VVT. ASM/MARS: Harry Hodges, WA6YO0. ACC: Evelyn Miller, KE6YXB. ASM/ADMIN: Pat Bunsold, WA6MHZ. ASM for Youth: Frank Forrester, K16YG. ASM for Red Cross: Al Rich, W6WYN. Bit Mgr: Steve Adams, K6PD. STM: Warren Dilley, KT6A. SGL Bob Spann, KE6BJL; OOC/TC: Del Radant, N6JZE. DECS: North: Dennis K7DCG, South: (vacant), East: Rich, N6NKK, Central: David, KC6YSO. Imperial Valley is now in the organizing phase. A great big thanks to Pat Bunsold, WA6MHZ, for serving two terms as Section Manager. He did a great job! He is very busy as the 1998 Convention Chairman so be sure to sign up for the 1998 (Ham Panda-Monium) and get your free Panda Logo pin! It will be Aug 14-16 at the Town and Country Hotel, Mission Valley. Great bargains at the AM/Computer Swapmeet 1st/3rd Sats at Santee Drive-in. DXers to be at the International DX convention in Visalia, CA May 1-3. Be sure to read this column each month for news from your section! If you have news, drop me snail mail at the address listed on page 12, an e-mail at k6zec@arll.org or on packet at k6zec@wb6dgr.# sca.ca.usa.noam. I look forward to serving as your Section Manager. Remember to listen to the section ARES Sunday Nets: 3905 @ 9 AM, 146.265 @ 7 PM. Traffic totals for Jan 98: SDCTN: Sess 30, QNI 230, QTC 96. ARESN: Sess 55, QNI 23, QTC 3. Tfc: KT6A 709, KD6YJB 171, KE6IQQ 61. PSRR: KT6A 136, KD6YJB 87. SDCTy Traffic Net 8 PM every night on 146.730 (-) Public Service, a mandate of Amateur Radio. Remember, Helping Others...Always Worthwhile!!

SANTA BARBARA: SM & STM: Rob Griffin, K6YR, 805-543-3346 & k6yr@arll.org—SEC: Jennifer Roe, AA6MX. ACC: Michael Altmore, KE6DKU. BM: Howard Coleman, W6HOA. OOC: Tom Perkins, KD6BXM. PIC: Jeff Reinhardt, AA6JR. TC: Warren Glenn, KM6RZ. ASMs: Doc Gmelin, W6ZJR & Don Milbury, W6YN. DECS: SB-Rick Laird, KB5OO. SLO-Jack Hunter, KD6HHG, & Ven-Dea Gilmore, AA6VH. The 1998 Mission Trail Net "Roundup" is set for 6/19-21 in Lancaster at the Antelope Valley Inn. Make your plans early to attend. Contact SM or N6JNS for details. CVARC VE Session produced 100% pass rate. Thanks to VEs WA6ECC, N6ALH & WB6DFW. CCC DX Club Proxy Dick, W6TKF, is now W6TK. Majority of the club members now have "1x2" call signs! Don't forget the 1998 Int'l DX Convention coming again to Visalia on 5/1-3. Contacts: N6IC or W6SR. New SoCal DX Club leaders: KN6DV, W8DX, N6KZ, KB6FXS, K6EXQ, K6SMF, KF6LF8 & K6RO recently elected. The SCDCX Website is a great resource for club & DX info: www.primenet.com/~scdcx. The International Morse Preservation Society (FISTS CW Club) is looking for new members. Contact Nancy, W28C, 810-737-5388 or nancy@tir.com for details. Wally, K7AMI, new SBARC VP for Emergency Services and ARES EC, recently outlined rigorous plans & goals to strengthen preparedness for the SB South Coast. Valuable reading for all ARES/RACES leaders. Contact Wally or SM for a copy. Several clubs are planning NOW for Field Day, 1998 in June. I encourage you to pick a job and sign up with your club. It's worthwhile for you, the ARES, and your community! Plus, it's FUN. SCN/SB: 9 P on 147.00+ 224.90 (131.8) & 448.875 (100.00). FTC/PSRR: K6YR 222/180, KE6MIW, 37/97, W6ZJR 83/-, KM6RZ 2/- & KE6GFV -97. 30. K6YR.

WEST GULF DIVISION

NORTH TEXAS: SM, Bob Adler, N5NY— Pkt N5NY @N5NY.#DFW.TX., e-mail: n5ny@arll.org. ASMs: KA5TTO, W5GPO, W5IWE, K5SSC, W5SIVD, KB5LES, W57NPH, W5NPF1, N5UQA, KB5YAM, N5WOY, KJ5AE, K5RE, K5LP, K5SXX, K5ZSB, KK5NA, KK5QA, KJ5GE, KC5EWI, KC5AYL, KB5JBV, W5FB, KX5K. ACC: K4TTT. STM: KC5OZT. SEC: K5UPN. PIC: W5SL. SGL: N5GAR. TC: KJ5BA. OOC: W5SUDA. BM: W5OH. Greetings All! Due to an extremely busy schedule and other pressing matters, this article will be extremely short this month. I apologize for this, but sometimes these things cannot be avoided. Thanks for your understanding! Once again, I would like to remind you that we are trying to "put together" another section level meeting and we need your input as to a particular day in April. The day that receives the most "votes" will be the day of the meeting. Of course, this applies to weekends only so that narrows it down somewhat. Send me your comments and/or replies as soon as possible. You may either send them by US Mail or to ka5tto1@swbell.net. Your comments will determine the outcome. That's about it for this month so take care and God Bless es 73 de Bob/KA5TTO.

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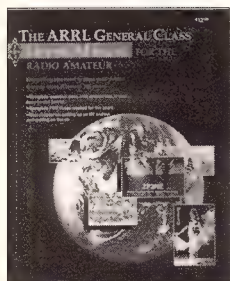
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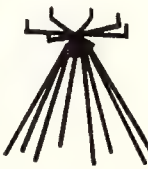
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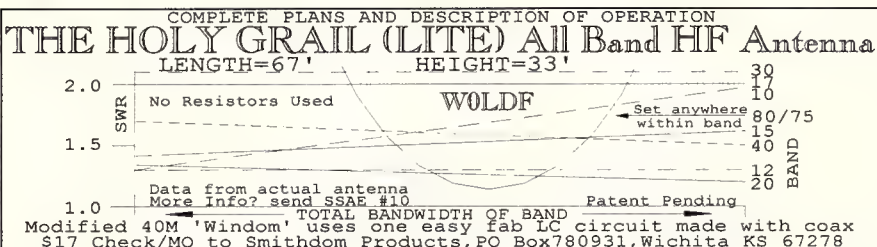
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OKLAHOMA: SM, Coy Day, N5OK—ASMS: N6CL, K5CPZ, K5TTT. SEC: W5ZTN. STM: AB5RV. ACC: KB5BOB. PIC: WA9AFM. OOC: K5WG. SGL: W5NZS. (http://www.telepath.com/n5ok/) Congrats to Charlie, ex-KB5ZUD, on his new vanity call, K5TTT. New URL's: RCWA, http://www.rcwa.org & TRO, http://troham.rapfire.net. Bob, N5BJ & A.J., N5NJA are preparing a package of first aid supplies for the people on Pitcairn Island. If you would like to help e-mail n5bj@juno.com or phone at 405-969-3861. The American Airlines ARC reelected all officers for another term. Waddy, N5WP Pres, Wade, N5PHV VP, Gary, AC5HZ Sec and Bob, NE5Z Treas. Thanks to Mason, WT5X, in Ada and others who are training new hams. Harry, K5CTRB reports Qwaso ARC new officers are: Pres - Dan, KA3GRJ; VP - Jim, KD6VPE; Sec - Kevin, KB5TVG; Treas - Jim, K5LAD. MORI will start FD plans at their business meeting April 7th at Denny's I35 and SE 29th. Mac, K2GKK, is wrestling with an uncooperative CD-ROM drive on his BBS. Tri-State ARG monthly meetings are held 2nd Thursday of each month in the Northwestern Electric Cooperative building in Woodward. Tri-State Hamfest and Eyeball QSO April 4th and 5th in Mooreland. Planned activities: On Saturday, two ladies programs, a QLF contest, intermod contest, a timed fox hunt with only HT's, swap tables, dealers and National Weather Service Skywarn Spotter Training at 6:30 P.M. RCWA is hosting a tailgate swapfest, an antenna contest, and "Oogly Ham" competition the 3rd weekend of May at the Claremore city park. Tfc: N5IKN 706, WBSNKC 591, N5GBN 328, WBSNKC 212, K5EJE 103, W5OUV 87, AB5RV 51, AB5J 34, W5REC 34, W5UCU 29, K5VUV 27, K5LQ 23.

SOUTH TEXAS: SM, E. Ray Taylor, N5NAV—April is the month that always starts with a joke. I hope everyone had a good laugh. It's good for the soul, at least smile, and it will make you feel better. El Nino has really shown his rage this year, with the ice storms in the north east, then the floods there and in California and Texas. For every bad thing, something good usually comes out of it. In one article a ham and his wife were able to get medical supplies through to the Red Cross. These acts of courage show team work pays off. Ham radio was again brought to the public eye as the only means of communications and aid during a disaster. 7290 Traffic Net is having their annual picnic near Ingram, Texas at the Bluff Trail Ranch Park, April 24th, 25th, and 26th. We have hams and their wives from several states join us in a great event. We get to meet those we talk to on the air. Saturday evening we always have a feast, then awards, and reading of the Silent Keys. Sunday service is dedicated to Silent Keys. For more details check into 7290 net Monday through Saturday 10:00 to 12:00 AM and Monday through Friday 1:00 to 2:00 PM CST. The Texas Traffic Net has their annual meeting at the 7290 picnic, Saturday about 2:00 PM, so if you a night per-person, the Texas Traffic Net meets every night of the week at 6:30 to 7:30 on 3873. We will keep you updated as the final details are released. There is plenty of room for everyone, so come join us. Space will not permit the gratitude I would like to express to the 7290 net. They get traffic into the impossible locations, and work around the clock during hurricanes or any other emergency that comes our way. This is in reference to ARRL bulletin 008 January 20, 1998, asking the FCC to put teeth into the band plan. I do hope ARRL will reconsider the band plan with 7290 as an AM calling frequency. Since the first publication in QST, AMers started interfering when the net starts and stop when the net is over, even when we had the Jarrell disaster in progress. Ham radio's main purpose is to provide communications during emergencies and the research they have provided in the field of electronics. During daily operation, operators are trained to handle traffic and perform as net controls. This net started in 1952, and has been performing the above duties since. How could the promotion of AM possibly be of more benefit to amateur radio and society, than a net that has been more interested in the health and welfare of communities from coast to coast, and the promotion of ham radio? Most all of the members are ARRL members. Robert Barron KA5WSS (PIC) sent out 17 letters only 7 responded. If you are interested in the position of PIO in your area, contact Robert. We need more exposure in our local media. Robert wanted to congratulate PIO Martha Underwood, for her article on the Jarrell tornado in January QST. New Hams on the block, no just new call signs. Congratulations to KB5RUG now WA5AA, KB5SYP now K55YP, KB5UCQ now K5UCQ, N9HRF now K5ROB, and WB5BKM now WB5BKM. Field Day is June 27 and 28—are you ready? Have you checked your equipment and supplies? The real purpose of Field Day is to see how well you can respond and set up in the field in case of a real emergency. How well trained are your groups. This is where clubs have a chance to train and equip the groups. I want to thank the clubs for sending me a copy of their newsletter. It helps me know your progress and needs. I do wish all the clubs in South Texas would do the same. 73 until next month. Tfc: W5YQZ, KK5QT 442, N5WSW 373, K55V 270, W5KLV 254, W5TFB 217, N5NAV 205, W5RZV 96, WB5YDD 84, W5CTZ 69, K5UCQ 69, WA5FXQ 45, WD5GKH 37, KD5GM 35, W5ZX 32, WA5AA 27, K5HK 22, N5OUJ 19, N5BMB 14, W5SHN 14, WD5AAH 6, KG5CX 6, N5LF 2, N5IJR 2, N5JUU 2.

WEST TEXAS: SM, Charlie Royall, WD5CJI, 915-944-0469 or cnroyall@wcc.net—SM sked: Apr—Lubbock, Big Spring; May-Pampa, Dumas, Amarillo, Peryton. New appt: Nesa Love/KC5ENL, OBS, Abilene. WTX SM awd: Don Goff/AB5BG, cert of merit, for yrs of overseeing special events and promoting ham radio. Upgrades: San Angelo, R. Kalinen, OH2LWO/K2LWO, Adv; J. Platt, KD5DFQ, Tech; Welcome 9 new hams/ARRL mbrs in Lubbock, KD5CWN, J. McMurray; KD5CZS, S. Jennings; KD5CVU, J. Ramon; KD5CUE, K. Hill; KD5CZR, V. Akkaraju; KD5CWQ, T. Bruton; KD5CWL, T. Bell, KD5CWO, K. Peterson, KD5CWN, F. Desimone. Odessa: KD5CNO, J. Hilliard, San Angelo: KD5CPA, C. Spence. Dist 1 SEC rpt: 14 Jan, 7 VA Med Ctrs held an SET with local VAMC testing effectiveness of ham radio as primary communications. Hams involved: SEC, N5LRH/Vernon; W5SVF/Glen, WA0NDZ/Michael; W5GAF/Jim; KA5KX/Ed; and KC5ZEE/Donna, exer coord. NTS DRN #5, Jan 98: 650 msgs, 62 sessions, WTX reps: WA5PDK, KF5NI, K5RYT. WTX rep'd 81% of region 5 nets; relayed by WA5PDK as sent by WB5YDO. With El Nino acting up, severe weather is on the upswing. SKYWARN classes are being held through the section. Attend one in your area. Your presence could save lives!

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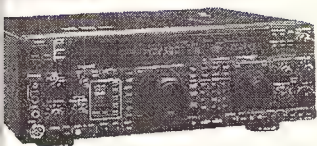
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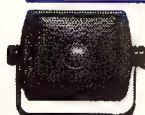
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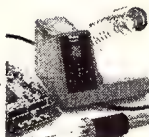
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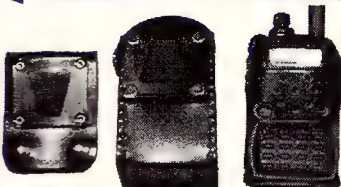
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SP-220	222	<.9	20 Adj.	650/200W	249.95
SP-7000	432	<.9	20 Adj.	500/100W	249.95
SP-23	1296	<.9	18	100/10W	359.95
SP-13	2304	1.2	18	50/10W	379.95
LNA	144	<.4	18	NA	219.95
LNA	432	<.5	18	NA	219.95
DX	1296	<.6	18	NA	249.95
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Aircom Plus	.27 1.37 2.50 4.63 6.55 7.62 10.39
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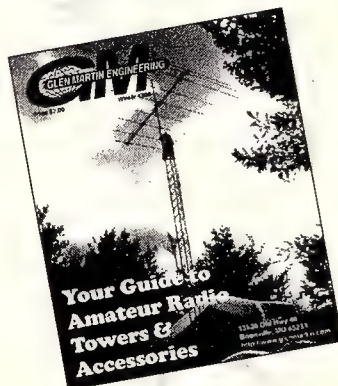
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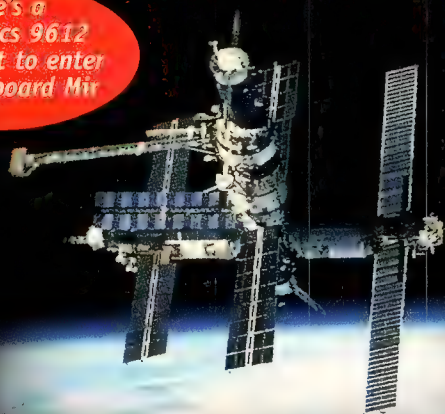
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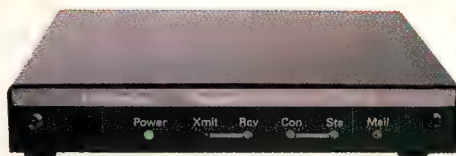
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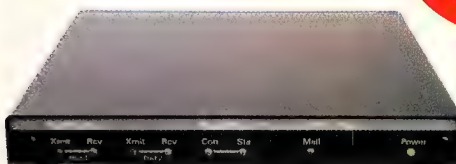
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TRAP DIPOLES

Model	Bands	Traps	Length	Price
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D-52	10/15/20/40/80	2	105'	79.95
D-56	10/15/20/40/80	6	82'	125.95
D-68	10/15/20/40/80/160	8	146'	162.95

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Model	Bands	Traps	Length	Price
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VS-32	10/15/20	2	13'	59.95
VS-42	10/15/20/40	2	24'	64.95
VS-53	10/15/20/40/80	3	42'	79.95
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* Can be used without radials * End Fed
* Feedline can be buried if desired * Permanent or Portable Use

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Model	Band	Length	Kit Form Price	Assembled Price
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D-15	15	22'	18.95	23.95
D-20	20	33'	19.95	24.95
D-40	40	66'	24.95	28.95
D-80	80/75	130'	29.95	33.95
D-160	160	260'	41.95	45.95

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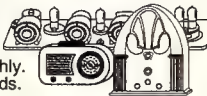
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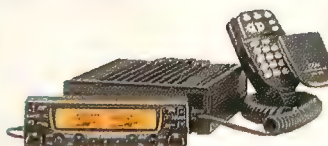
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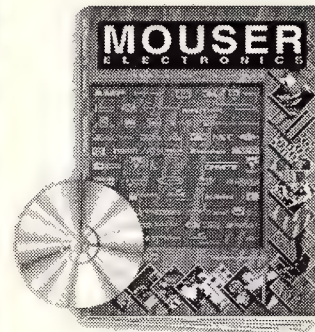
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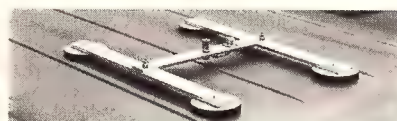
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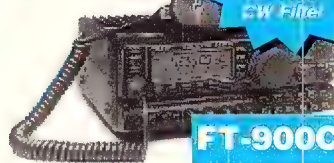
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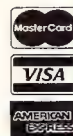
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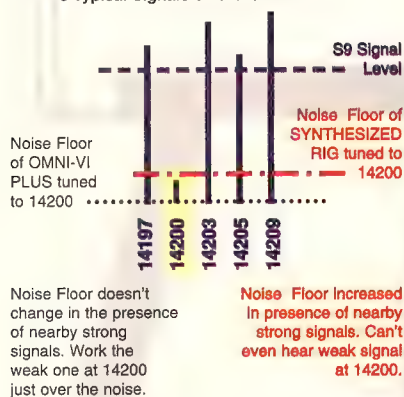
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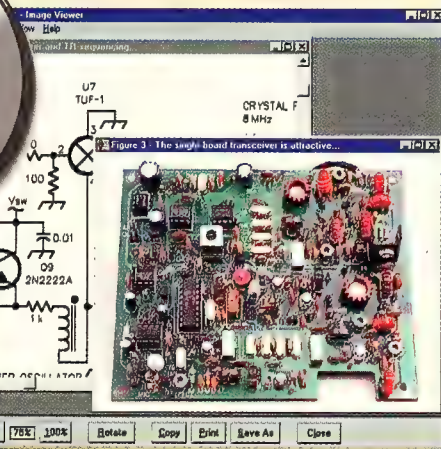


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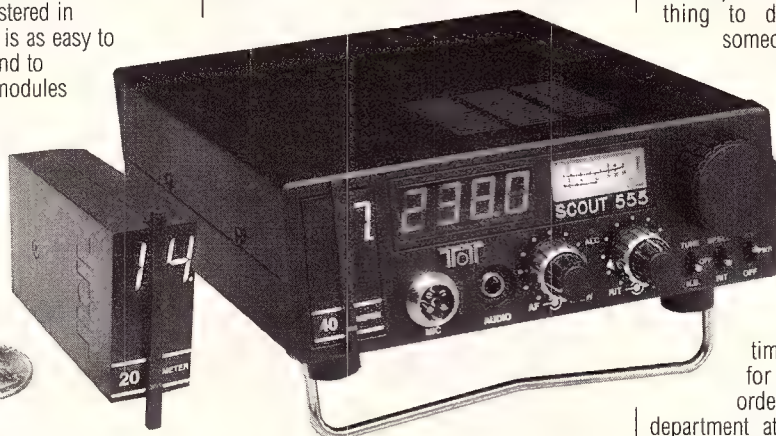
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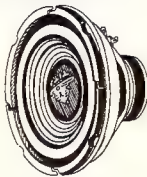
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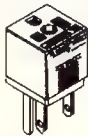
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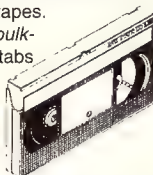


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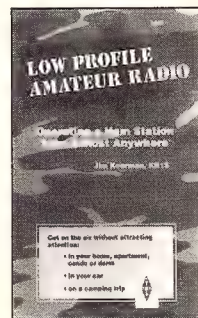
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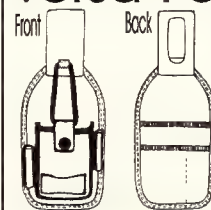
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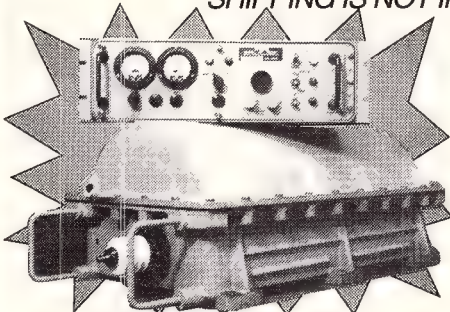
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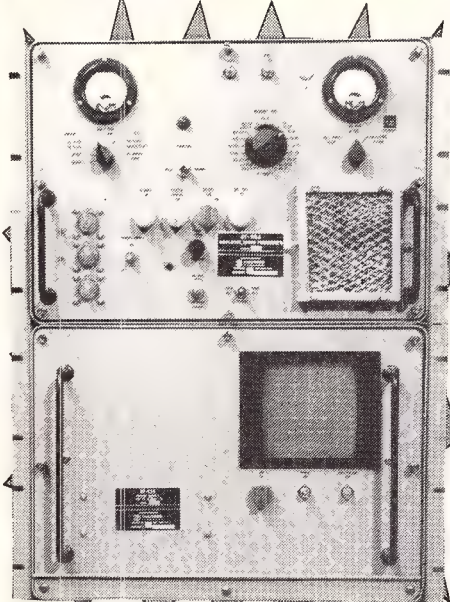
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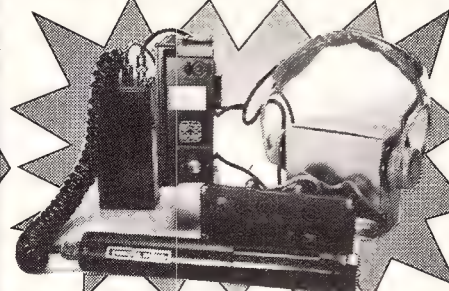
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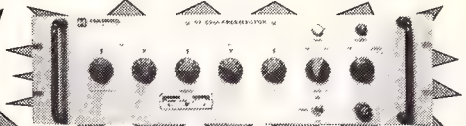
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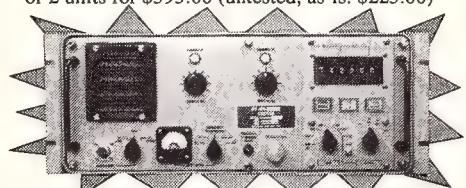
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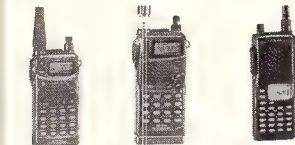
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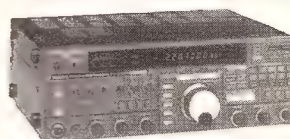
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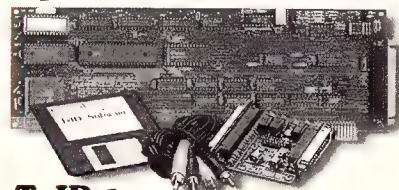
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TICKET DEADLINES

- Advanced registration orders must be postmarked no later than May 1 (USA) or April 24 (Canada).
- Ticket requests that are received **AFTER** the deadline will be processed and **HELD** for pick-up at the Hara Arena box office beginning Wednesday, May 13 at 9:00 a.m.

EXHIBIT SPACE

See our Web site for more information. (www.hamvention.org)

■ Inside Exhibit Booths

For an application, please Fax (937) 376-4648 or E-mail to exhibits@hamvention.org

■ Outdoor Flea Market Space

For an application, please Fax (937) 276-8902 or E-mail to fleamkt@hamvention.org
Flea market spaces are sold IN ADVANCE ONLY. No spaces sold at gate!

UNOFFICIAL ACTIVITIES

To be listed in our program and on our Web site, please Fax (937) 274-8369 or E-mail to info@hamvention.org

SPECIAL SERVICES

Details are available on our Web site. (www.hamvention.org)

- A limited number of paid reserved ADA parking permits are available. Free ADA off-site parking is also available. Please send requests via Fax/Phone: (937) 669-1163 or E-mail to lmccoy@glasscity.net
- License Exams reservations are recommended. Walk-ins accepted, if room is available.

BUS SERVICE

Bus service will be provided between Hamvention, Air Force Museum, Salem Mall and Forest Park Mall parking areas. Check our Web site for more information. (www.hamvention.org)

COMMUNICATIONS

WWW: <http://www.hamvention.org>

MAIL: Hamvention, Box 964, Dayton, Ohio 45401-0964

FAX: (937) 274-8369

E-Mail: info@hamvention.org

PHONE: (937) 276-6930. Chairman Voice Mail box numbers are available on our Web site.



General Chairman: Dick Miller, N8CBU
Asst. General Chairman: Jim Graver, KB8PSO

ADVANCE REGISTRATION

FOR CHECK OR CREDIT CARD ORDERS:

Make checks payable to: Dayton HAMVENTION
Enclose the amount indicated in U.S. dollars. For credit card orders, please add \$1.25/ticket service charge. A \$25 service charge will be assessed on all returned checks.

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Please type or print your name and address clearly!
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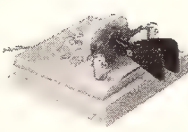
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1) Advertising must pertain to products and services which are related to Amateur Radio.

2) The Ham-Ad rate for commercial firms offering products or services for sale is \$1.00 per word. Individuals selling or buying personal equipment: ARRL member 50¢ per word. Non-ARRL member \$1 per word. **Bolding** is available for \$1.50 a word.

3) Remittance in full must accompany copy since Ham-Ads are not carried on our books. Each word, abbreviation, model number, and group of numbers counts as one word. Entire telephone numbers count as one word. No charge for postal Zip code. No cash or contract discounts or agency commission will be allowed. Tear sheets or proofs of Ham Ads cannot be supplied. Submitted ads should be typed or clearly printed on an 8 1/2" x 11" sheet of paper.

4) Send ads to: the ARRL, 225 Main St., Newington, CT 06111 ATTN: Ham Ads. Or via fax 860-594-0259 or e-mail: hamads@arrl.org Payment must be included with ads (check or any major credit card accepted).

5) Closing date for Ham-Ads is the 15th of the second month preceding publication date. No cancellations or changes will be accepted after this closing date. Example: Ads received March 16th through April 15th will appear in June QST. If the 15th falls on a weekend or holiday, the Ham-Ad deadline is the previous working day. Please contact Robin Mickett, NIWAL at 860-594-0231 for further information.

6) No Ham-Ad may use more than 100 words. No advertiser may use more than two ads in one issue. A last name or call must appear in each ad. Mention of lotteries, prize drawings, games of chance, etc. is not permitted in QST advertising.

7) New firms or individuals offering products or services for sale must check with us to determine if a production sample (which will be returned) should be submitted for examination. Dealers are exempted, unless the product is unknown to us. Check with us if you are in doubt. You must stand by and support all claims and specifications mentioned in your advertising.

The publisher of QST will vouch for the integrity of advertisers who are obviously commercial in character, and for the grade or character of their products and services. Individual advertisers are not subject to scrutiny.

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RAINBOW AMATEUR RADIO ASSOCIATION, the gay/lesbian club. Active HF nets, newsletter, uncensored listserv, web page: <http://www.rara.org>. Privacy respected. PO Box 191, Chesterland, OH 44026-0191. E-mail: RARA@EN.COM

THE ARRL LETTER — The League's news digest for active amateurs, professionally produced and edited and now available in weekly electronic edition via the World Wide Web at <http://www.arrl.org/arrlletter>

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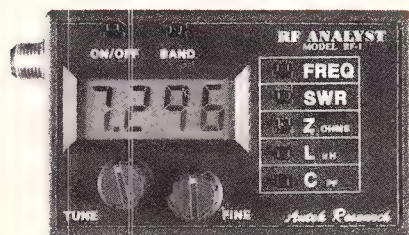
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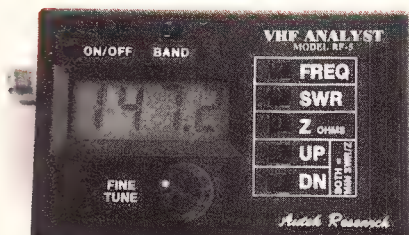
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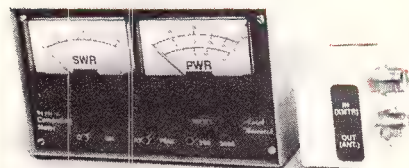
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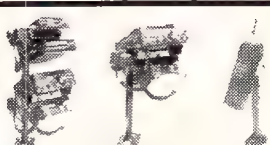
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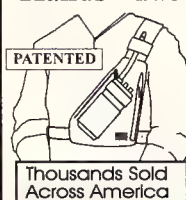
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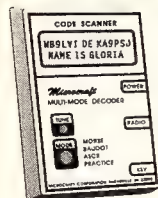
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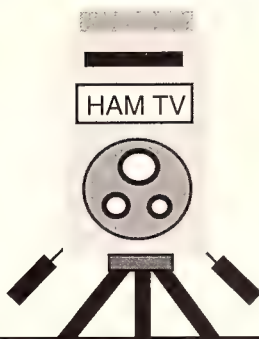
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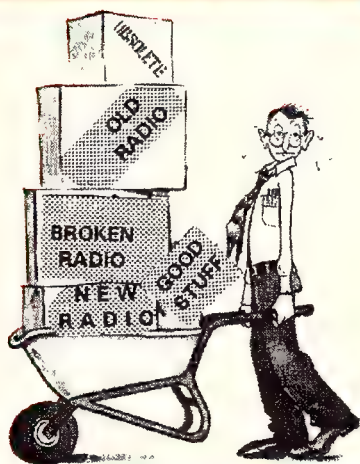
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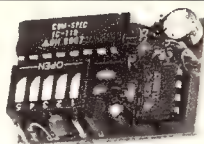
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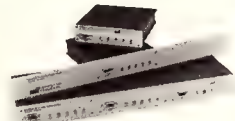
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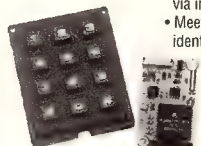


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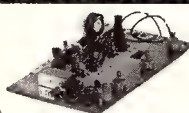
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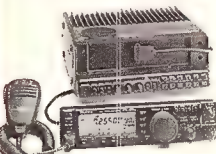
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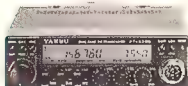
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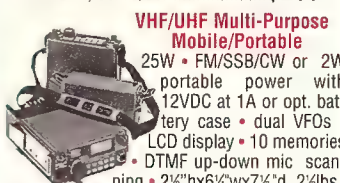
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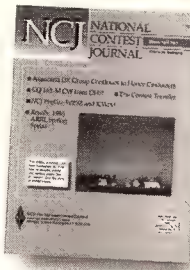
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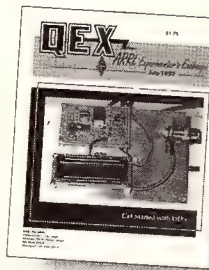
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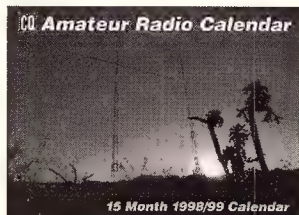
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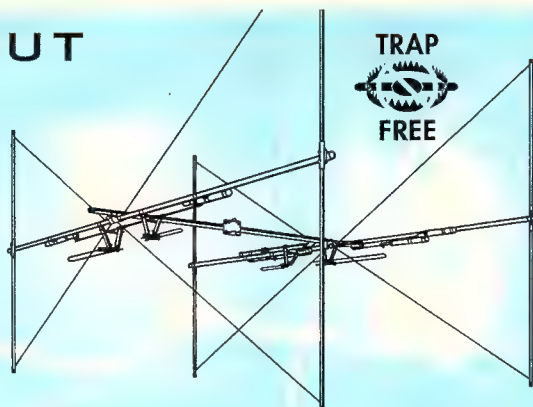
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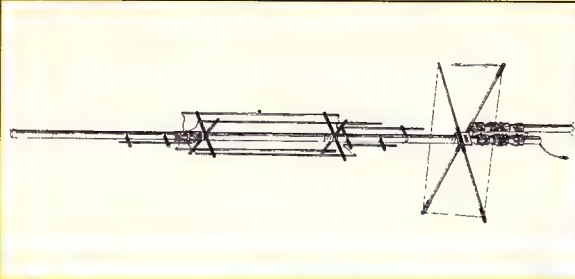
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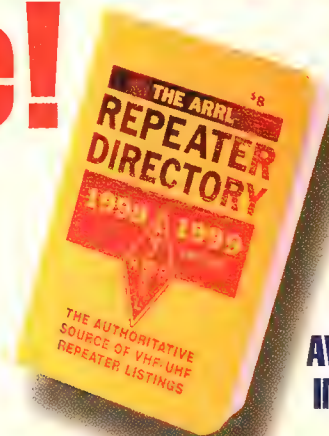
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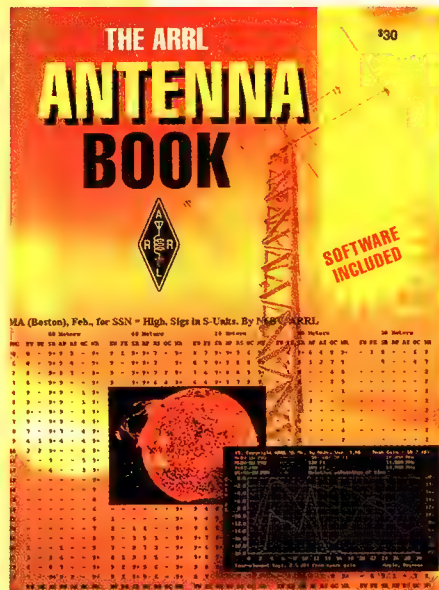
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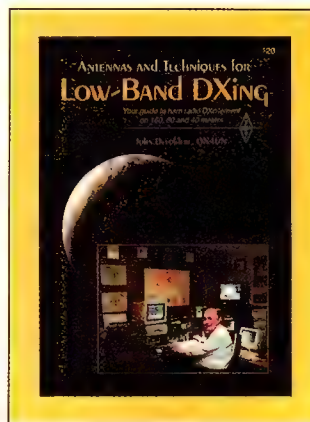
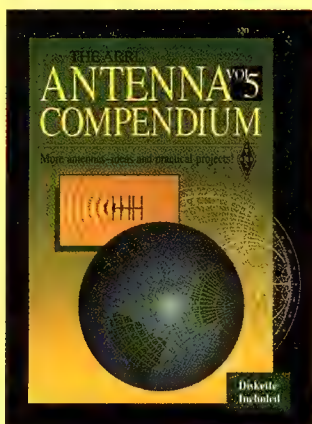
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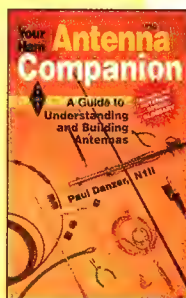


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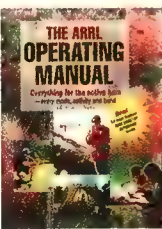
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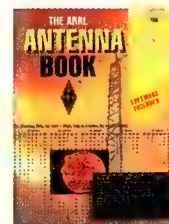
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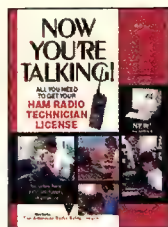
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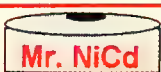
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†Smallest HT as of Jan. 1998

Seeing is Transceiving

Portable SSTV is here! Kenwood's new VC-H1 Visual Communicator combines an image-scan converter, CCD camera and LCD monitor in a compact battery-operated unit. Simply hook it up to your Kenwood transceiver to start sending and receiving color images over the air.

VC-H1 Visual Communicator

► Ideal for outdoor SSTV

Until now, for anyone interested in SSTV (slow-scan television), portability has not been an option. But thanks to component miniaturization the VC-H1 is not only small enough for handheld use but it runs off 4 AA batteries so you can take it anywhere. This makes it ideal for field days, special events, disaster communications and even fishing trips.

► Full compatibility

The VC-H1 can be connected to any transceiver with just a cable, and it offers full compatibility with all of the standard SSTV formats. Uploads/downloads are quick and easy; the images are also sharp and clear.

► All-in-one design

In addition to the detachable 1/4-inch CCD camera, the VC-H1 features a 1.8-inch color TFT (thin film transistor)-type display. As well as viewing incoming pictures, you can review your own prior to transmission. The built-in microphone & speaker can be used in place of a separate speaker-microphone for your transceiver.

► Image memory

Up to 10 pictures can be stored in memory. This allows you to compare and pick the best shot to send. You can also store incoming pictures and protect them from unintentional deletion.

► Computer connectivity

One of the great features of the VC-H1 is the ability to work with a personal computer. Hook it up to the RS-232C port on your laptop using the optional connection kit (includes Microsoft® Windows® 95 software) and you can save pictures (in JPEG format) that you send and receive. You can then cut and paste using standard graphics software, or even superimpose your own text. What's more, you can actually control the VC-H1 from your computer.

► Call sign superimpose

► AF mute

► Auto power-off

270,000-pixel CCD image sensor

1.8-inch TFT-type color display

Microphone & speaker

360-degree rotatable camera head (detachable)

Operates on 4 AA alkaline batteries

SPECIFICATIONS

- Terminals: Data I/O (for transceiver), Video in, Video out, COM (for computer), DC IN (4.8 ~ 7.0V)
- Dimensions, projections not included (WxHxD): 2-5/8 x 1-3/8 x 6-3/4 in (62 x 30 x 160 mm)

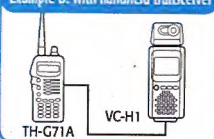
Specifications are subject to change without notice. Screen-shot photographs are simulated.

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Example A: with transceiver & laptop



Example B: with handheld transceiver



TH-G71A

144/440MHz
FM Dual Band



- 6W (VHF), 5.5W (UHF)
- PC programmable
- 200 memory ch. with alphanumeric display
- MIL-STD 810E (rain & shock)
- CTCSS tone scan
- DTMF memory (10 ch. up to 16 digits)
- Wide-range coverage



ISO 9001
JQA-1205

Communications Equipment Division
Kenwood Corporation
ISO9001 certification

KENWOOD
Amateur Radio Products Group
98ARD-1717

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